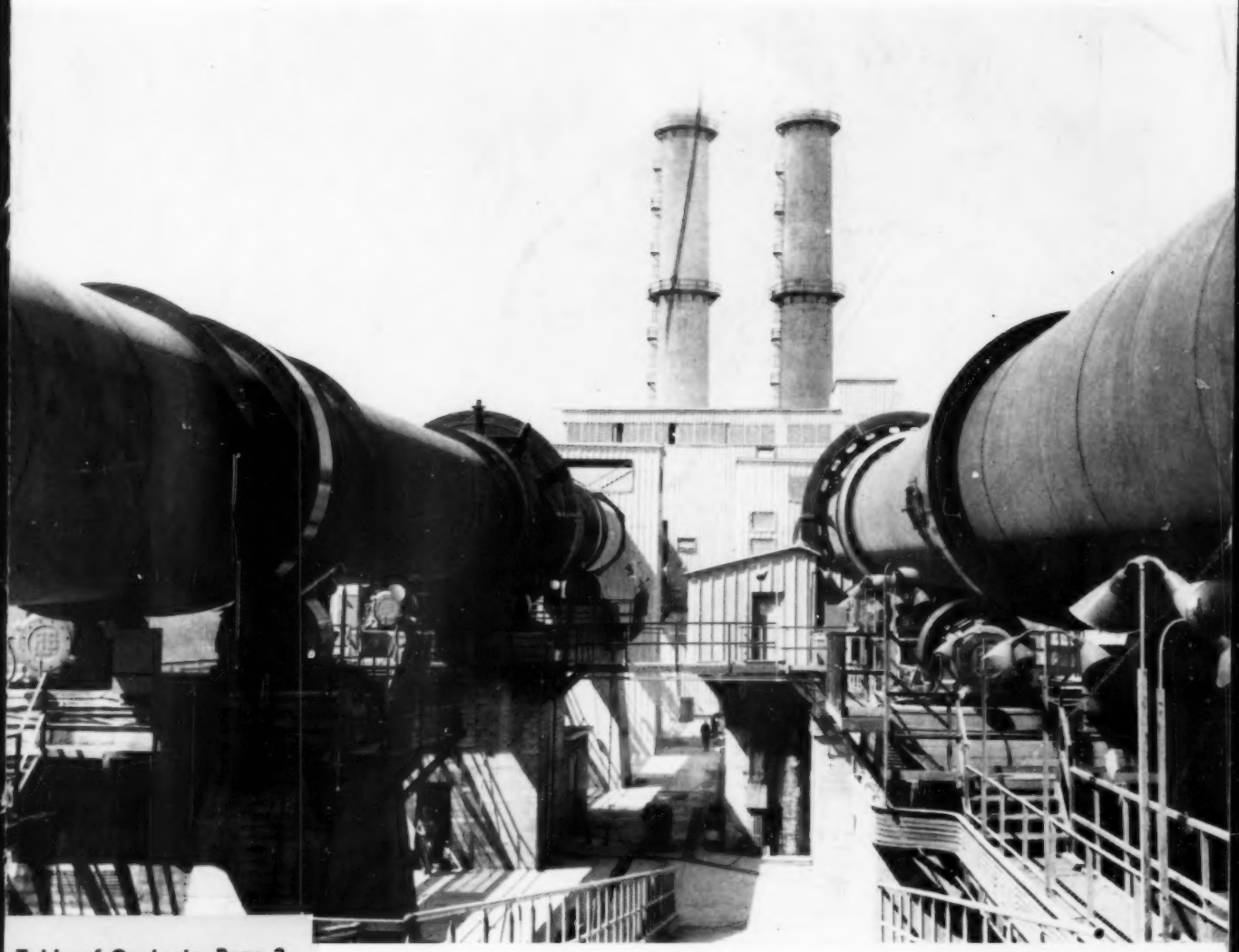
For producers of Sand and Gravel, Crushed Stone, Cement, Lime, Gypsum, and other nonmetallic minerals

JULY 1957

PIT and QUARRY



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The Two 12- by 450-Ft. Kilns in the New Woodstock, Ont., Plant of Canada Cement Co. (See Page 72)

ANNUAL CEMENT MILLS ISSUE

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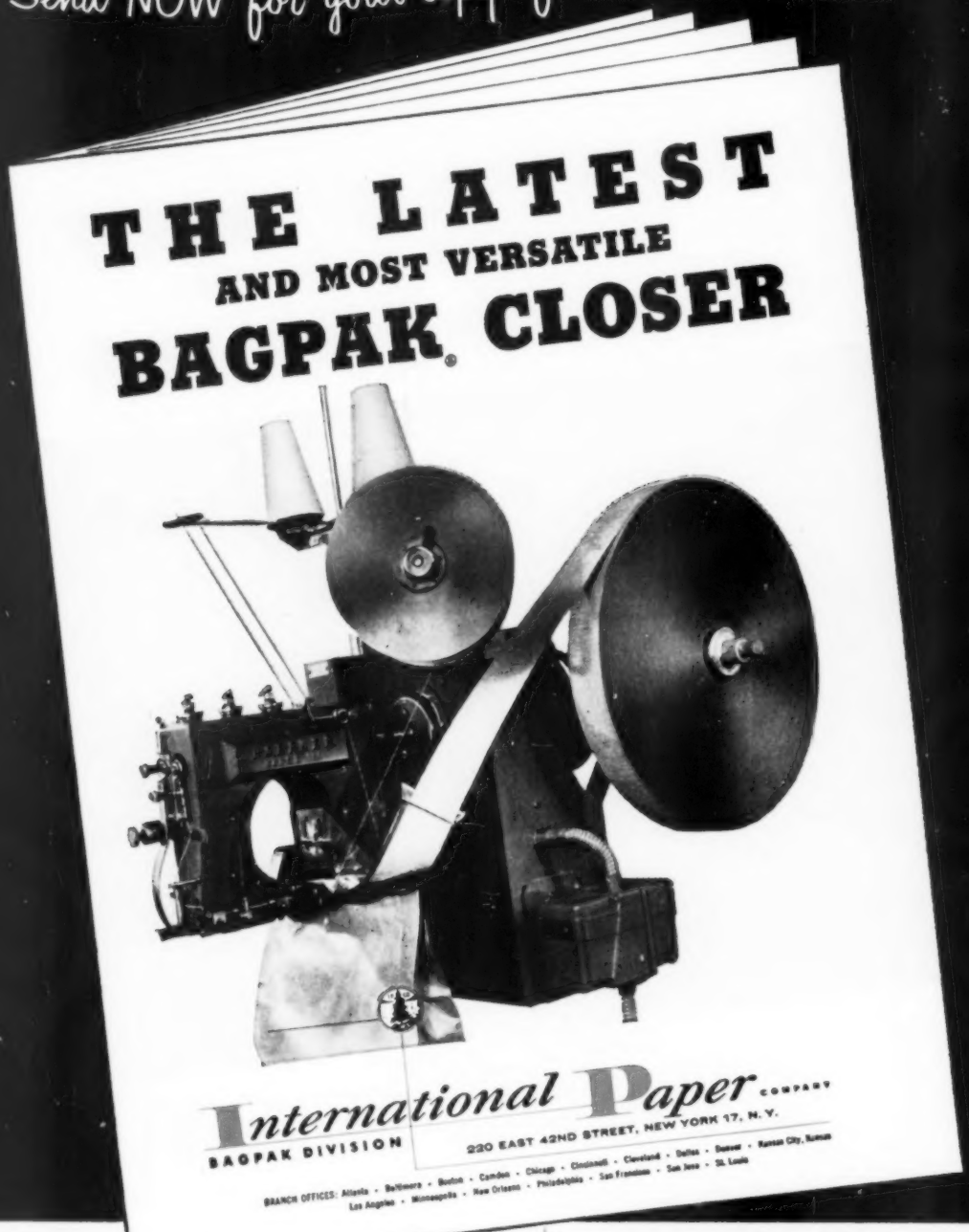
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pit and quarry

JULY 1957 Vol. 50 No. 1

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Cover Picture

• The picture on the cover of this issue of PIT AND QUARRY shows the two 12- by 450-ft. rotary kilns in the new Woodstock, Ont., plant of the Canada Cement Company. This large and modern operation has many unusual and interesting features and is completely described in this issue. Near the discharge ends of these kilns can be seen the structures housing the elevators which return collected dust into them. In the far background are the two 200-ft. high kiln stacks.

Published on the first of each month for producers and manufacturers of Cement, Crushed Stone, Gypsum, Lime, Sand, Gravel and other nonmetallic minerals. Copyright 1957 by Pit and Quarry Publications, Inc., 431 S. Dearborn Street, Chicago 5, Illinois. PIT AND QUARRY magazine was founded by H. W. Baumgartner, October, 1916.

To subscribers: When requesting change of address, kindly send old as well as new address.

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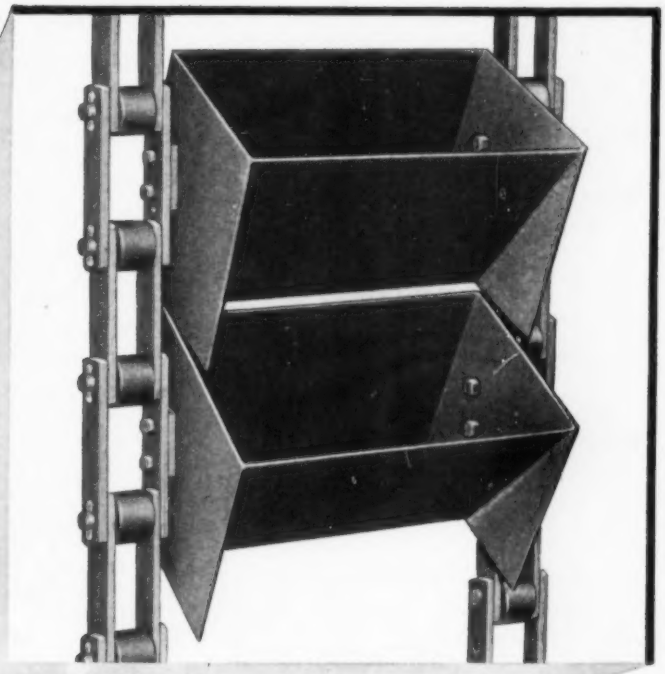

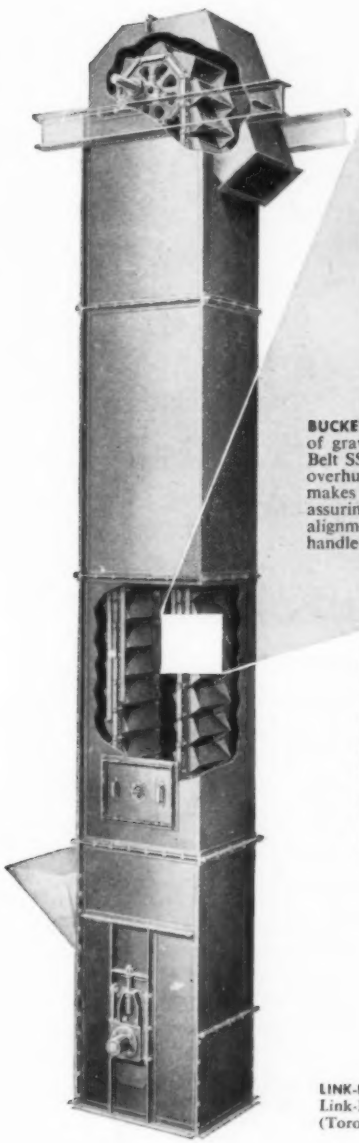

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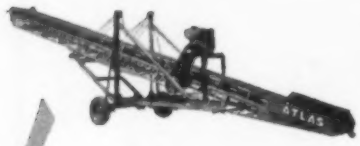

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For toughest digging. 10 sizes—¾ to 3 cu. yds.

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Made in 3 service types, with capacities from ½ to 3 cubic yards, "A" Series Automatics are available for immediate delivery. Ask your nearby Page Automatic Distributor for complete details.

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Automatic Dragline Buckets
Walking Draglines

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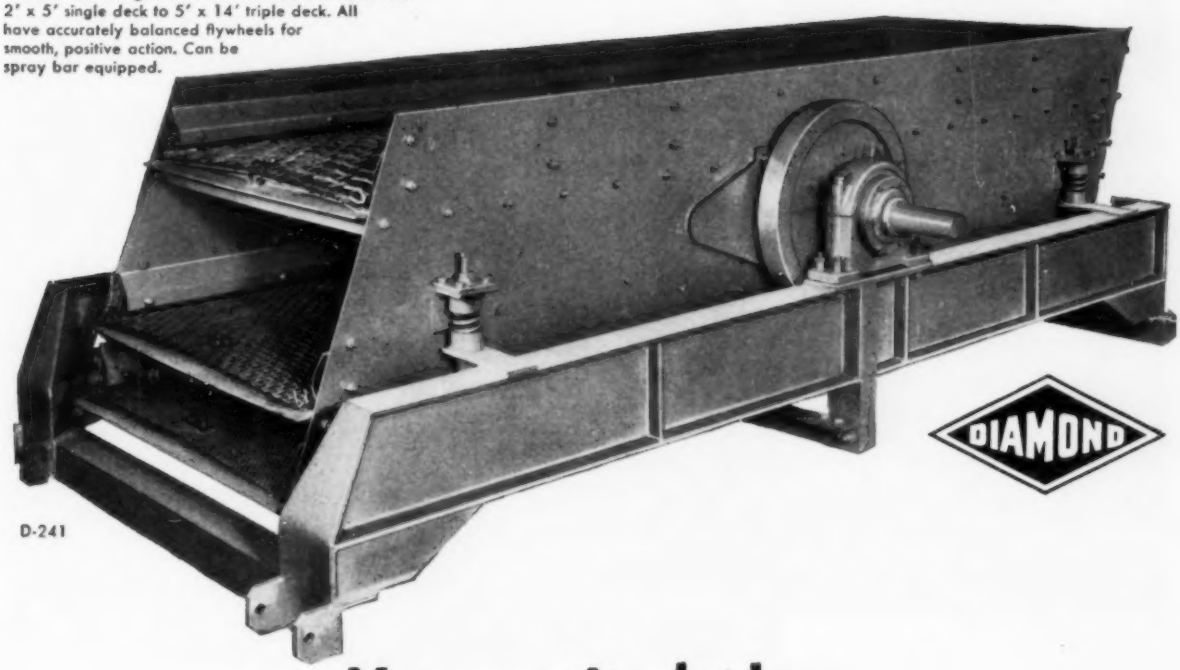

D-241

You can't choke a Diamond BALANCED Vibrating Screen!

No screen at any price works harder and does more than a Diamond. It's fast . . . does a thorough job of separating materials without clogging and can be depended on for long, trouble-free operation.

Here's why. Generous space between decks of a Diamond BALANCED Vibrating screen provides ample clearance for material to pass. High walls prevent overflow. An eccentric shaft transmits circular, pulsating motion with a pronounced vibration over the entire length and width of the screening area without affecting supporting members. And Diamond's method of screen cloth anchoring with center rise causes material to automatically work toward the sides.

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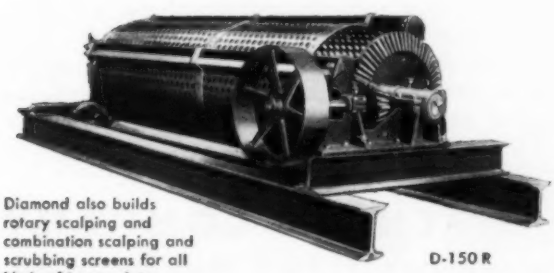
You can choose your Diamond BALANCED vibrating screen from a variety of sizes and capacities. Reinforced side plates are standard, shackle or cable suspension mountings optional.

Every day, more and more companies are benefiting from the efficiencies and economies of Diamond BALANCED vibrating screens. Get full details today.



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D-150R

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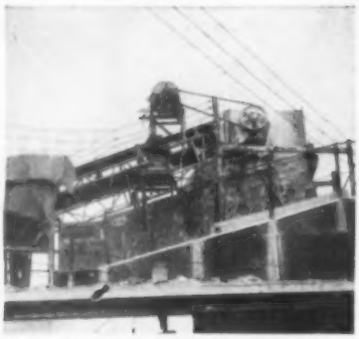
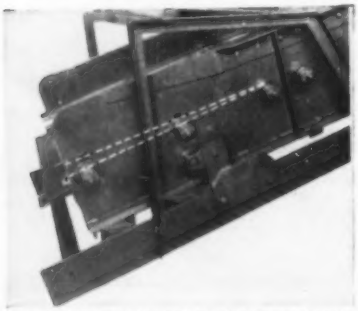


This is the new type UHS 5′ x 14′ Triple-Deck Deister that screens an average of 1,500 tons daily for the Meshberger Stone Company of Columbus, Indiana.



EXCLUSIVE ADJUSTABLE SLOPE PANELS

Panels at both feed and discharge ends may be adjusted independently to increase or decrease screening angle.

"We couldn't ask for any better screens than DEISTER makes"

That's the considered opinion of the two men who run the busy Meshberger Stone Co. aggregate plant at Columbus, Indiana—in the famed limestone belt of Southern Indiana.

"We couldn't ask for better screen equipment than Deister," says Leon Meshberger, president. "After 11 years experience with Deister, I wouldn't consider anything else."

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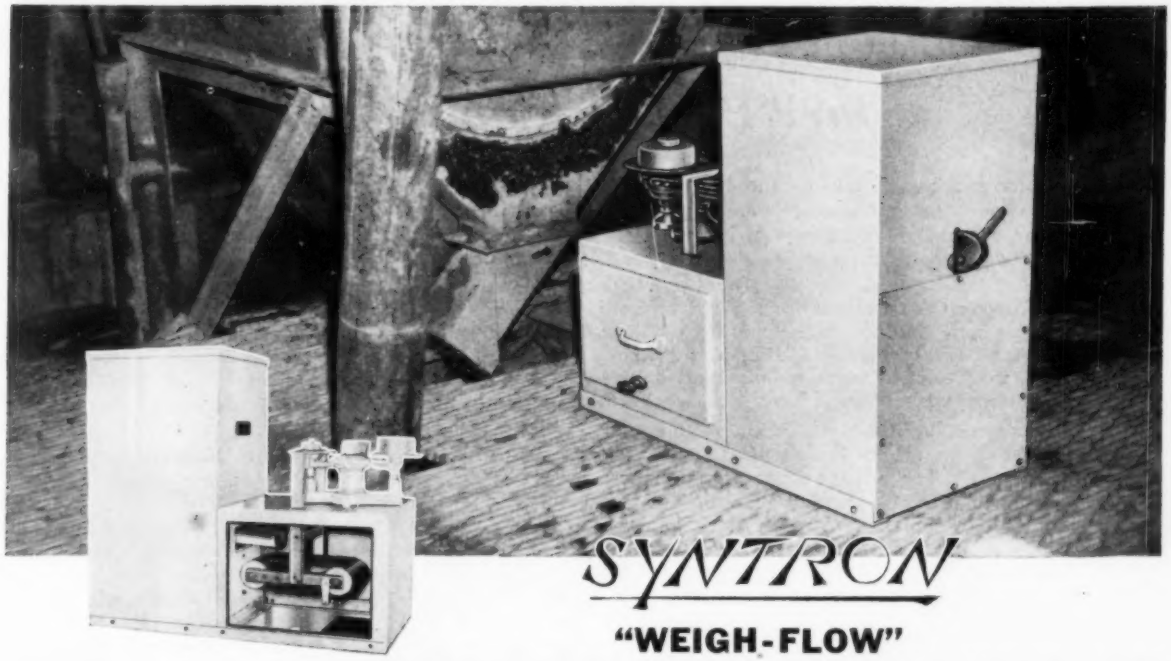

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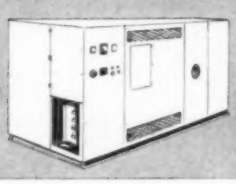

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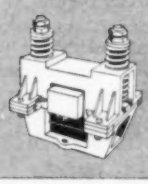

GASOLINE HAMMER ROCK DRILLS

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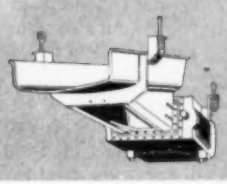

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The Editor's Page

Our "People's Capitalism"

IT has become increasingly obvious through the years that one of our most serious and far-reaching problems is the growing dislike and even hatred of the United States which exists in many parts of the world. Some argue that this is merely due to envy of our high standard of living or to ingratitude for the extensive aid we have given to these countries, by helping to save them from aggressors, by direct economic and financial aid, and by outright gifts of millions or even billions of dollars. It is obvious, however, that this is not the answer.

According to some authorities, one of the main reasons for this anti-American feeling lies in the fantastic and often dangerous misconceptions about the American economic system that exist around the world. This was the conclusion of a group of 12 leading Americans from different walks of life, after a thorough analysis of the subject. Details are given in a 64-page report recently issued co-operatively by Yale University and the Advertising Council.

THIS report contains a digest of the eighth session of the American Round Table, started in 1950, and is the first such discussion sponsored by the Advertising Council jointly with Yale University. Like the ones preceding it, this discussion is an attempt to create a concensus that could become the possession of the average man; it aims to help fill a serious vacuum and to meet a need made clamorous by the challenge of international communism. To quote from the Round Table report:

"The economic system of this country is poorly understood or positively misunderstood, not only by the enemies who wish to present America in an unfavorable light, but also by friends of this country and even by the American people themselves."

"Because of the fantastic misconceptions that prevail and because of the importance of the war of ideas, it behooves us to re-think and clarify our mental image of the American economic system. . ."

This system the Advertising Council has named the "People's Capitalism." Some of the conclusions arrived at in this report are the following:

"1. Of all the great industrial nations, the one that clings most tenaciously to private capitalism (the United States) has come closest to the socialist goal of providing abundance for all in a classless society.

"2. People's Capitalism has flourished because the people have a chance to vote with their dollars in the market place, thus deciding for themselves what is to be produced instead of taking what the government decides to provide for them.

"3. The American economy has steadily approached the highest goals of People's Capitalism because of (a) wide distribution of the policy-sharing processes in the economy either through the consumer making his choices in the free market or through distribution of control by distribution of ownership; (b) recognition among business and labor leaders that economic enterprise must be conducted with regard for the public good; (c) public demand for a rising, dynamic way of life; and (d) broad distribution of the benefits of the economy among the population.

"4. American capitalism presents the picture of an extremely highly-developed technology at work upon an unparalleled wealth of natural resources. Resources become wealth only when a people have the organization and the skill to use them effectively. The American Indians had all the resources we have today but received little benefit from them.

"5. Underlying the American economic system have been spiritual ideas that have been fostered since the birth of our country. These ideas stress the merit of economic endeavor, economic progress, and economic gain. Poverty has never been considered a virtue in this country. These spiritual ideas have contributed to a moral commitment of fair play and self restraint, enabling the economy to control itself, in part, without being subjected to rigid or pervasive government controls.

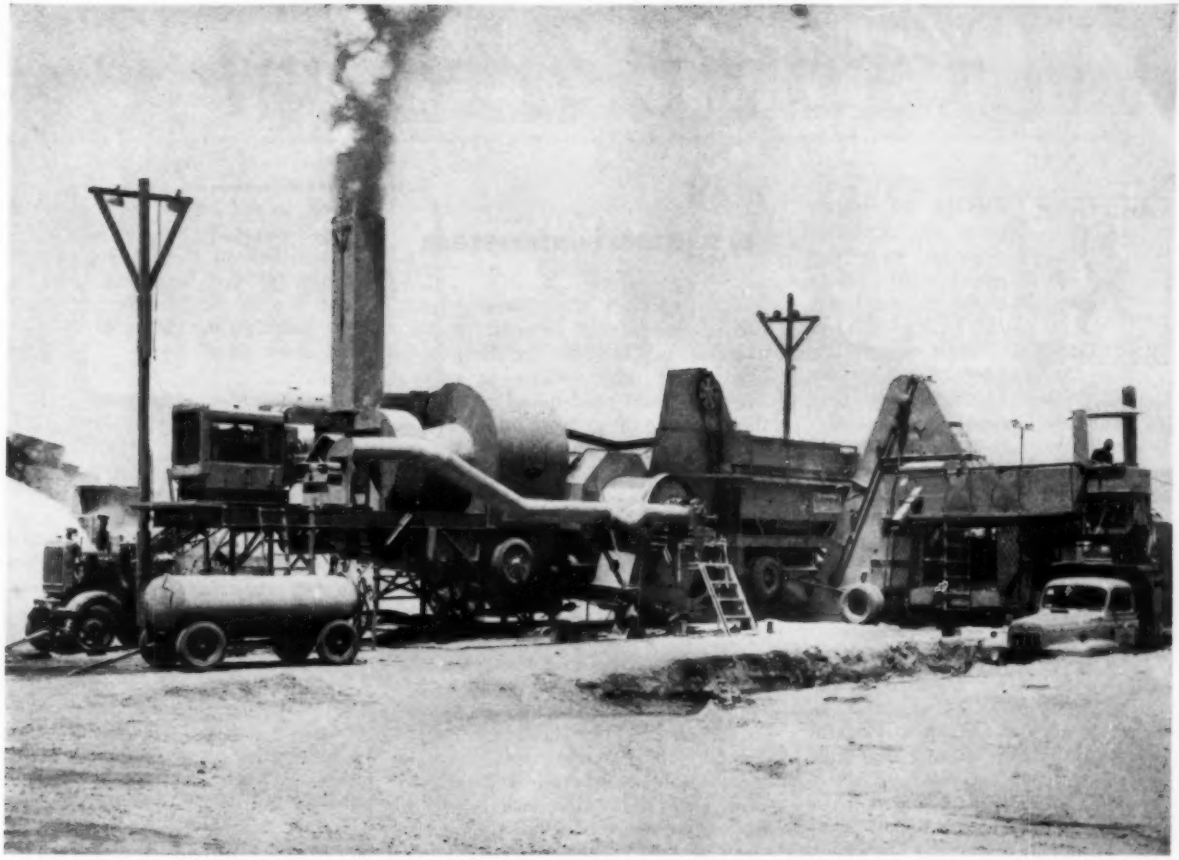
"6. The American ideal of equality of opportunity has fostered the growth of People's Capitalism by creating high goals for the population and thus stimulating their economic energies.

"7. The ideal of a classless society, though never fully realized, has reinforced the ideal of equality of opportunity by creating the belief that no man is confined to a fixed status and that every man has the opportunity to forge ahead."

In closing its report, on the People's Capitalism the American Round Table came to the following conclusion: that "It is clear that the American model is not duplicatable in its entirety and it would be paternalism for us to act as if it were. Therefore we must strive to present our system with clarity and in terms which will show how others may avail themselves of parts of it for use that will vary in every instance. The Soviets have made a great error in refusing to let other peoples come to socialism in their own way. We must be more flexible than the Russians by recognizing that peoples of other countries can come to people's capitalism in their own way."

Everyone who visits foreign countries on business or pleasure or has foreign visitors must seize every opportunity to present these facts to them. Only by convincing as many people as possible in these countries of the truth about our economic system can we ever hope to overcome a misconception which can endanger the peace of the world. Our enemies are doing everything possible to create misunderstandings with us and misconceptions about us; we must miss no opportunities to correct and prevent such misunderstandings.

Walter E. Trauffer



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NEED MORE POWER FOR PRODUCTION?

You can get all the power built into your diesel and heavy-duty gasoline engines. Use a lubricant that meets their specific requirements . . . *Texaco Ursa Oil Heavy Duty*.

With *Texaco Ursa Oil Heavy Duty* your engines run smoothly and clean—delivering *more power* with *less fuel* over *longer periods* between overhauls. *Texaco Ursa Oil Heavy Duty* is carefully refined and de-waxed, and fortified with a number of special additives. These agents enable it to (1) inhibit oxidation, (2) assure full detergency and dispersion, (3) prevent rust, (4) protect bearings, (5) withstand high pressure and temperature, and (6) minimize wear.

Why waste your engines' power potential? Try *Texaco Ursa Oil Heavy Duty* today. Or better still, have a Texaco Lubrication Engineer analyze all your lubrication needs. Call the nearest of more than 2,000 Texaco Distributing Plants in the 48 States, or write:

The Texas Company, 135 East 42nd St., New York 17, N. Y.

• ***Texaco Regal Oil R&O*** has been specially developed for air compressors and hydraulic equipment. It keeps systems clean, lines clear—assures dependable performance *always*.

• ***Texaco Crater*** and ***Texaco Crater X Fluid*** lubricate both wire rope and open gears. They keep the wire rope strong longer—protect the teeth of open gears.

TEXACO

TEXACO Lubricants and Fuels

FOR ALL CONTRACTORS' EQUIPMENT

Washington News Letter

FROM the standpoint of big business, at least the most significant thing to come out of Washington in recent weeks has been the Supreme Court's decision in the DuPont case involving the Clayton Anti-trust Act. While the executives and owners of medium-size and small businesses may feel that this decision involves only the industrial giants and has no relevance to their problems, the fact is that the Supreme Court has made a decision which may ultimately have wide-reaching implications for all business.

The facts of the case are fairly well known. About 40 years ago the DuPont Company bought a block of stock in the struggling General Motors Corporation. Since that time DuPont has increased its holdings to the point where it now owns approximately one-fourth of the General Motors stock. The Supreme Court ruled, by a majority of four to two, that DuPont's interest in General Motors posed the likelihood that it would dominate a market illegally, in violation of the Clayton Act. The court found the violation in the market for auto paints and fabrics where General Motors buys a large proportion, not quite half of its requirements, from DuPont.

The fact so disturbing to big businessmen in this action is the Court's decision that the violation existed so many years after the stock purchase occurred. Heretofore, it has been generally assumed that, to break up a monopoly, the government has to move at the time one company acquires a substantial interest in another or, at least, within a short time thereafter.

In this case, however, the doctrine seems to have been developed that an action which initially may not have been illegal, can become illegal, with the passage of time and subsequent developments. Presumably, the government could now take a second look at any stock acquisition that has taken place since the passage of the Clayton Act back in 1914. This point was made by Justice Burton in his dissenting opinion.

By S. HERBERT UNTERBERGER

The possibility of retroactive justice is a horrifying thought. If this doctrine is used by the Supreme Court and other courts in other cases, it would raise questions about the stability of a large number of business transactions. This sort of precedent is worrying business men more than the actual effect on either DuPont or General Motors of the court's particular action in this case.

Another departure from what had heretofore been thought to be the rule occurred when the Supreme Court applied the anti-trust doctrine to vertical combinations, that is combinations between companies in which one buys or sells its products to the other. The Clayton Act was amended in 1950 to permit its application to such vertical combinations, but when that was done, it had been assumed that previously the Act had applied only to horizontal combinations; that is, the situation in which one company buys an interest in a competing company. The court apparently has ruled that this Act applied to vertical combinations from the very beginning. Here again is a situation in which businessmen may have thought they were engaging in a perfectly legal transaction, only to discover later that they formed a vertical combination in violation of the law.

Questions are being asked in Washington about what the government is likely to do with its new-found anti-trust power. Most people are guessing that very little additional anti-trust activity will occur as a direct result of this sweeping ruling. The Anti-trust Division of the Department of Justice already has its hands full with cases currently in process. It is unlikely, therefore, to start a whole new series of investigations of vertical combinations. Also, it will take some time before the lawyers have thought through and argued through what can and what cannot be done under the newly promulgated rules. At the moment, everyone is waiting to see what the courts will finally require DuPont to do. There is at least a reasonable possibility that they will not be required to sell all or even most of their General Motors stock.

Nevertheless, this ruling points strongly to the fact that there is much life still left in the anti-trust laws, and that the era of "trust-busting" is not over.

Tax-Loss Mergers

A popular form of business combination in recent years has been the merger of profitable corporations with corporations that have for some years shown losses. The advantages result, of course, from the tax benefits that can be derived. With the carry-forward provisions in the tax laws, it was possible to offset for a time the losses which the "loss" corporation brought with it against the profits of the merged corporation, thereby reducing the tax liability substantially. As a consequence, for many companies which were not able to do well, their principal asset was their tax loss.

Another recent decision by the U. S. Supreme Court may have put an end to this practice by limiting the possibilities so severely as to make such a merger impracticable except in a very narrow set of circumstances.

The principal facts in the case were as follows. Back in 1949 16 separate retail corporations were merged. Three of these corporations had incurred tax losses prior to the merger. The question before the Supreme Court was whether the net operating loss of these three companies could be carried over for each of the three succeeding taxable years by the merged corporation. The court ruled that this could not be done.

In so doing, it accepted the argument that a prior year's loss can be offset against the current year's income only to the extent that the income comes from the operation of substantially the same business that produced the loss. In this case, although the merged operation continued to operate retail stores, including the stores which substained the preceding loss, the court found that it was not the same business, and hence the loss could not be carried over.

(*Continued on page* 186)

The BIG SCREEN for the BIG JOBS

ALLIS-CHALMERS SCALPING SCREEN

FIELD TESTED FOR 3 YEARS

- **Engineered to Handle the Toughest Job in Any Rock Products Flow**
- **Extra-Large Mechanism**

HERE'S an *extra heavy duty* screen built to take punishing loads coming from your primary crusher. Its rugged cartridge-type, oil-lubricated mechanism features giant bearings — the largest ever installed in a vibrating screen. The heavy I-beam and channel-constructed screen deck support frame can withstand impact of large pieces and high tonnage.

Reduced Maintenance — Simplified two-bearing cartridge mechanism can be pulled out after removing sheave and four bolts. Large size bearings mean extended life, less frequent replacement.

Vibration Isolation — Standard design includes multi-unit vibration *isolators* — two per corner, each with an inner and outer spring arrangement. Vibration to building or structure is isolated even when sticky materials adhere to the screen.

For complete information, see your A-C representative or write for Bulletin 07B8368, Allis-Chalmers, Industrial Equipment Division, Milwaukee 1, Wisconsin.

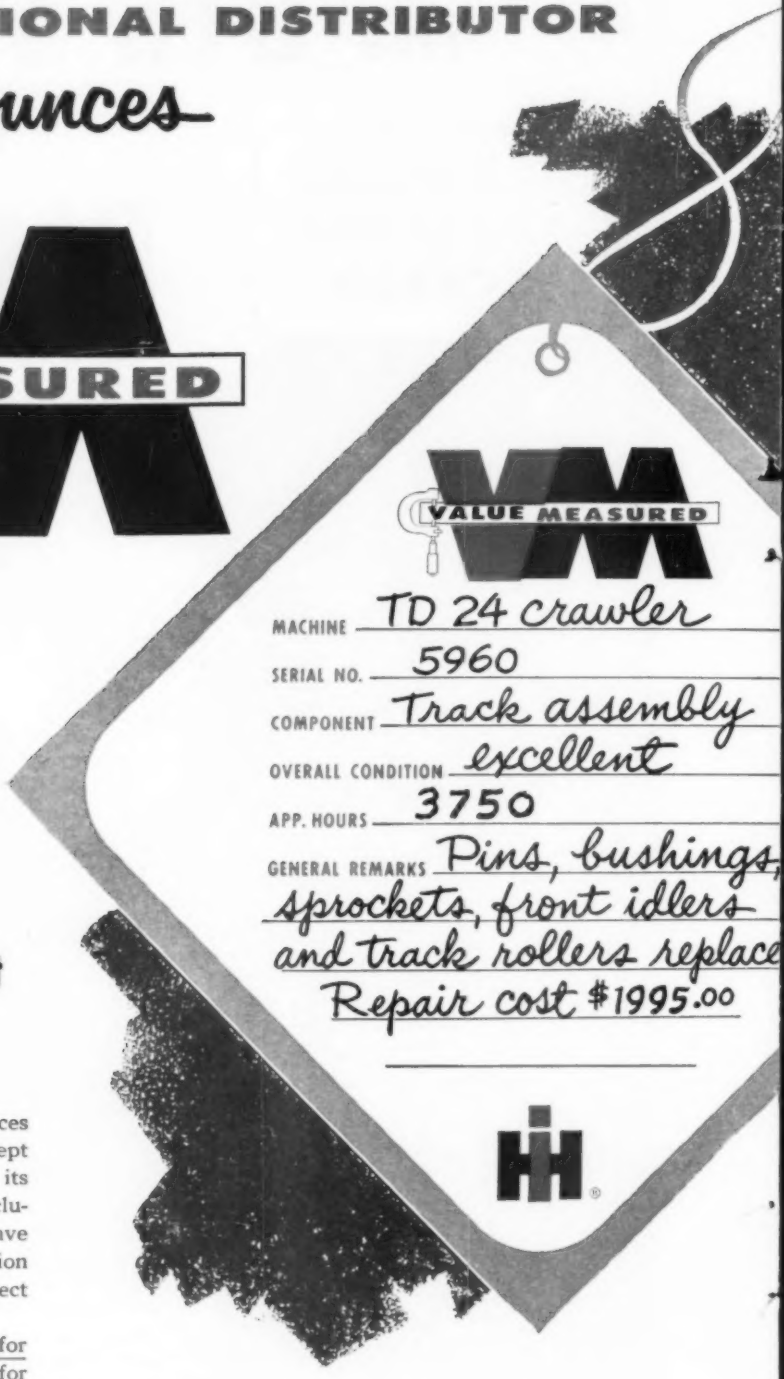
ALLIS-CHALMERS

A-5063

YOUR INTERNATIONAL DISTRIBUTOR

proudly announces

VM
VALUE MEASURED



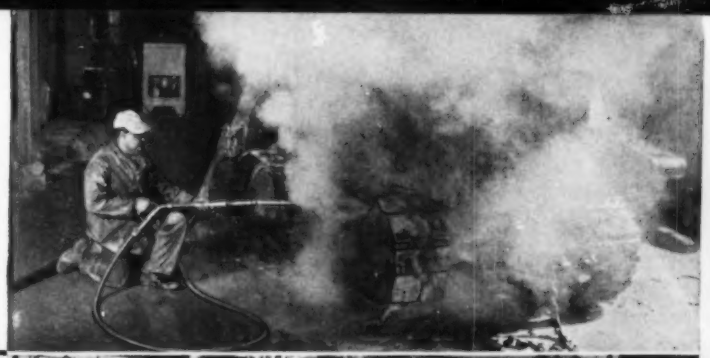
The exclusive equipment buying plan that Value Measures used machinery and its component parts before you buy!

Your International Distributor proudly announces VM...a revolutionary equipment buying concept that measures the value of used machinery and its components before you buy! Now, under this exclusive International Distributor program, you can have a reasonable answer to your most important question when buying used equipment..."What can I expect of this machine and for how long?"

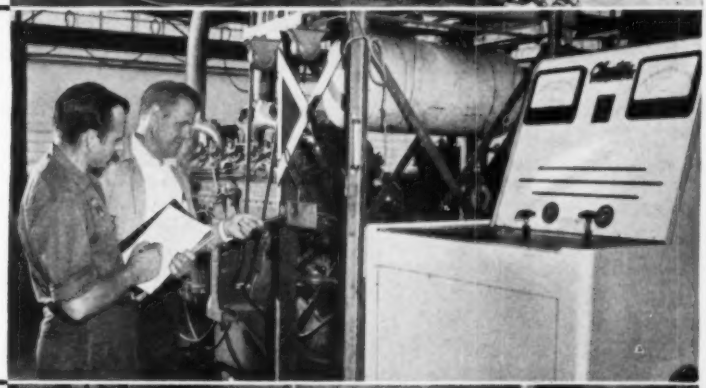
The answer is supplied in two ways, not only for the over-all condition of the machine but also for all the major parts of the machine as well! And the answers are easy to get. They're all tabulated for you on big tags, (see illustration, above), which are attached to the component or near it. Each tag names the component, gives you the over-all condition of it, tells the approximate hours of operation (because parts are changed in units at different times), and shows whether the item has been repaired or replaced with a new part. The tags permit you to examine a piece of used machinery quickly, completely, and with confidence. In fact, VM – the IH Value-Measured Used Equipment Plan–does for you what you yourself would like to do to check used equipment, if you had the time and facilities.

Your International Construction Equipment Distributor has Value-Measured Used Equipment buys on his lot, now. Be sure to see him soon and find out why VM is your best way to buy used construction machinery.

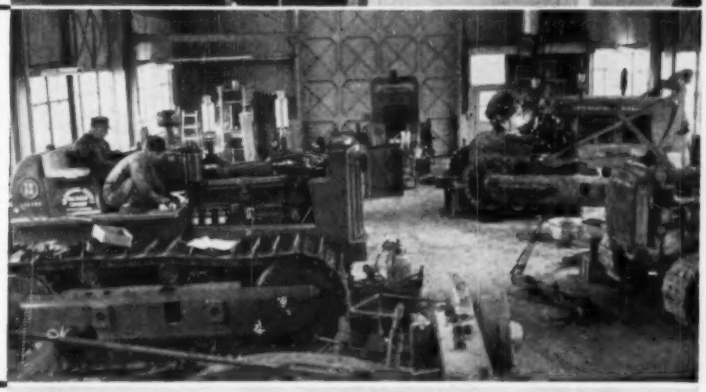
Clean-up! A Value-Measured Used Equipment buy first gets a steam bath before inspection of major parts. Clean machine reveals wear, cracks, other damages which need repair.



Check up! Dynamometer engine testing is typical of thorough inspection and testing before and after worn engine parts are replaced. Testing equipment of this type enables distributor to guarantee performance on VM equipment.



Fix up! After testing, distributor servicemen make necessary repairs and adjustments to equipment. All such repairs and their cost are tabulated on VM tags which you'll find conveniently attached to the components.



Measure up! You'll find the VM buy headquarters sign only at your International Construction Equipment Distributor. Stop here soon if you need used construction equipment...and become acquainted with the industry's newest, safest, and most economical way to buy used machinery...the VM way.

VM Purchase Certificate is your guarantee that every major working area of the used machine has been thoroughly checked and repaired, or replaced, when necessary. It also means your VM used machine is the best buy for the price.

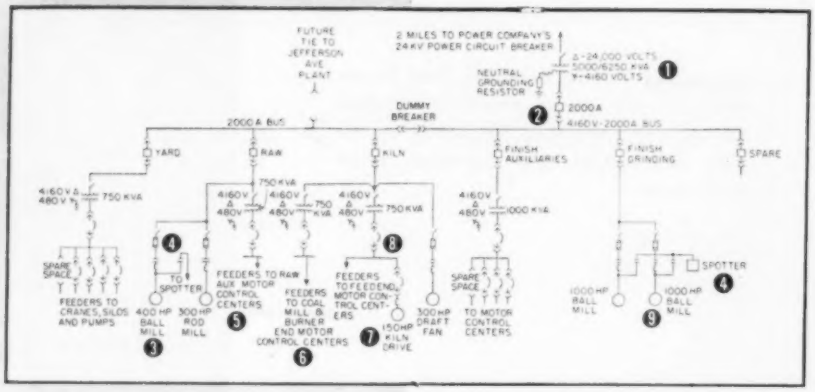
INTERNATIONAL® CONSTRUCTION EQUIPMENT

International Harvester Co., 180 N. Michigan Avenue, Chicago 1, Illinois

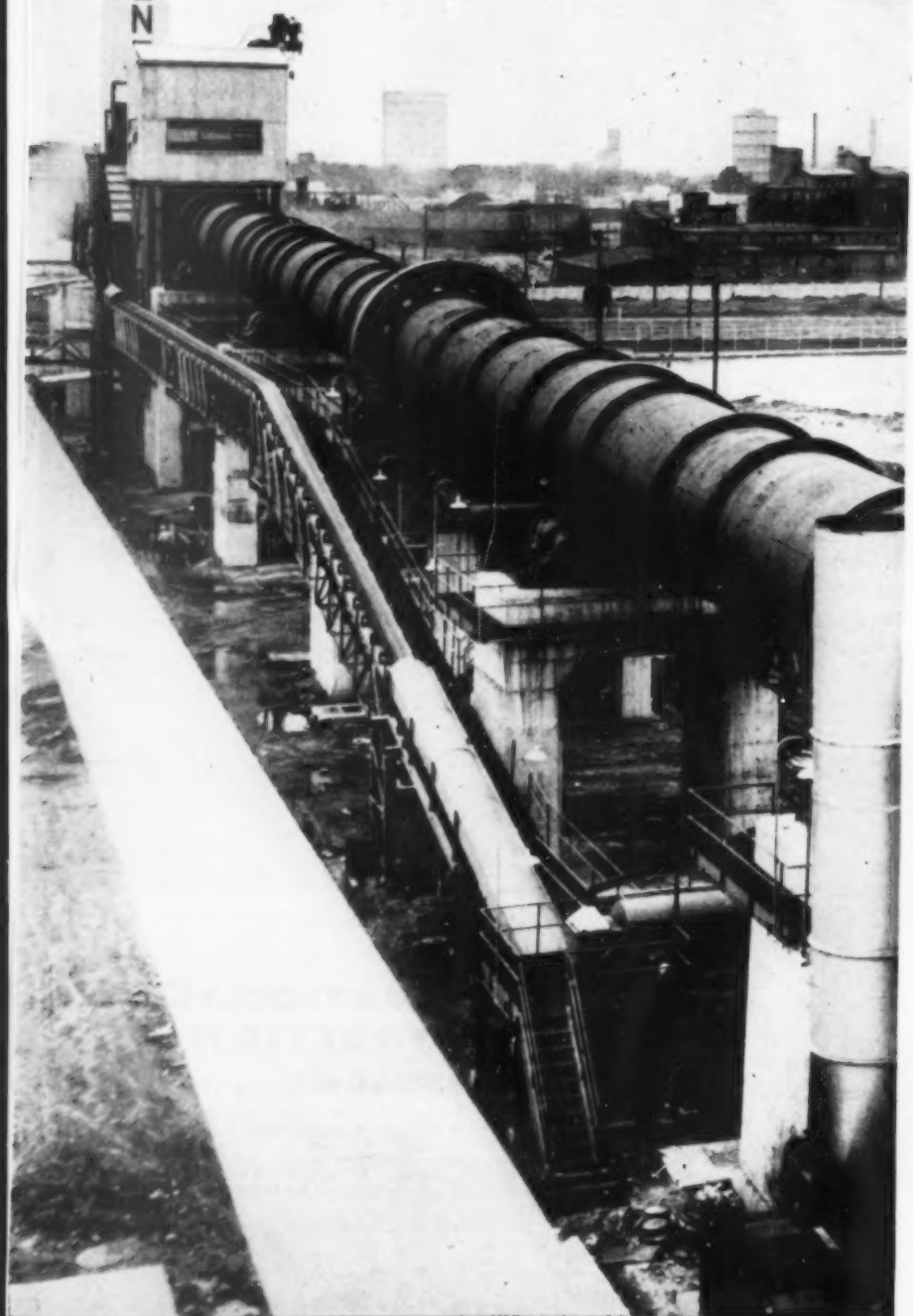
A COMPLETE POWER PACKAGE: Crawler and Wheel Tractors . . . Self-Propelled Scrapers . . . Crawler and Rubber-Tired Loaders . . . Off-Highway Haulers . . . Diesel and Carbureted Engines . . . Motor Trucks . . . Farm Tractors and Equipment.

PEERLESS CEMEN

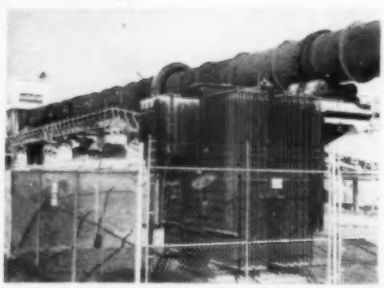
ENGINEERING REPORTS:



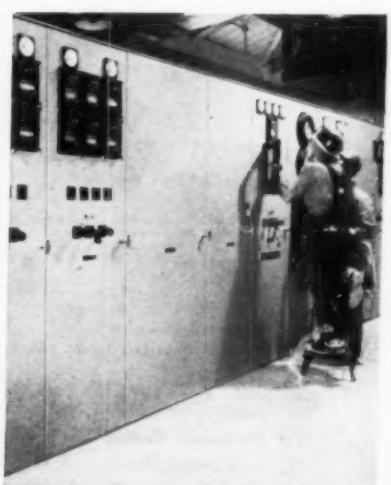
SYSTEM PARTICIPATION of G.E. in Peerless plant is shown by one-line diagram, keyed to photos. According to Peerless, start-up time for new equipment was one-third of original estimate due to on-time delivery by G.E. and other companies.



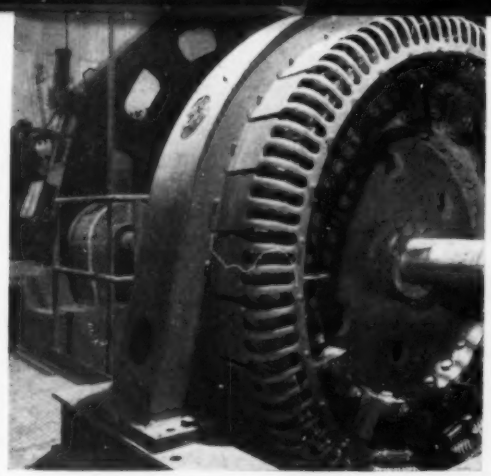
General Electric flexible power



1 **ELIMINATION** of transient overvoltages (except those caused by lightning) is provided by neutral grounding of G-E 5000-kva main transformer.

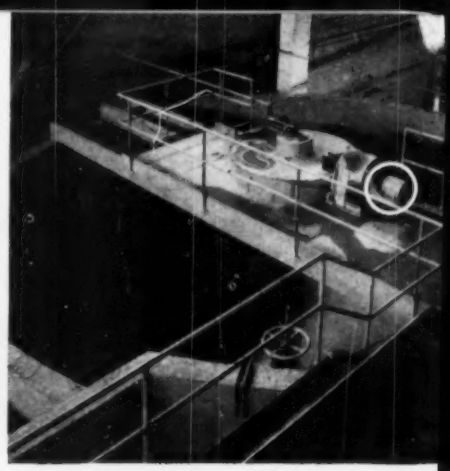


2 **QUICK ISOLATION** and location of electrical faults is made easier by G-E metal-clad switchgear, arranged with feeders for each plant department.



3 **HIGH TORQUE** 400-hp G-E synchronous motor drives ball mill in raw department. Positioning is controlled by G-E Limitamp* starter and spotter.
*Registered trade-mark of General Electric Co.

4 **ACCURATE CONTROL** and spotting of raw and finish mills, plus safer isolation of low voltage equipment, is provided by these G-E Limitamp controllers.



5 **RELIABILITY** of clay wash mill agitator, and other continuous operation auxiliaries, is increased by General Electric Tri-Clad* '55' induction motor.
*Registered trade-mark of General Electric Co.

engineering, equipment provide system at new Peerless plant

Peerless Cement Corp. recently completed its second Detroit area installation—the $7½-million Brennan Avenue plant. The plant, which produces 1,250,000 barrels per year, has increased Peerless' overall production by 25%.

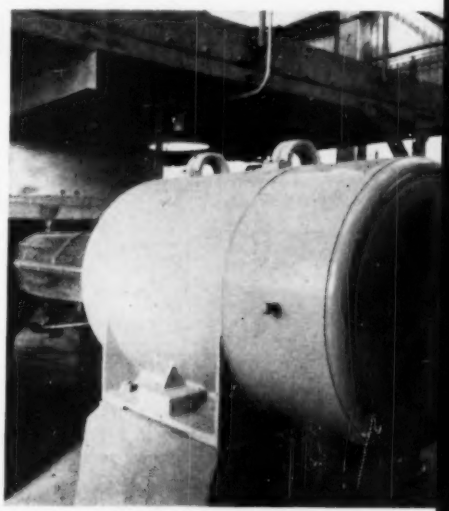
In this important expansion project, General Electric system engineers worked with Peerless engineers and their consultants, Giffels and Vallet Inc., L. Rosetti, in planning the primary distribution system. A provision was made for possible future addition of two kilns to increase production to 3,750,000 barrels annually. General Electric engineers also helped determine the proper voltage, starting requirements for ball mill motors, and provisions for a future tie with Peerless' nearby plant on Jefferson Avenue.

Contributions of General Electric engineers, coupled with latest G-E equipment, helped Peerless build a flexible electrical system with provisions for future expansion.

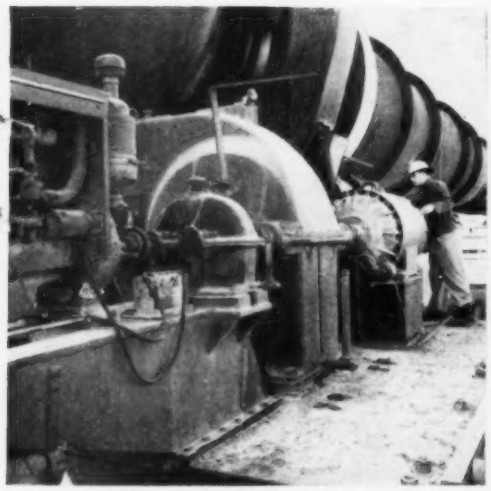
Whatever your electrical needs, General Electric engineers and equipment can work for you. Contact your nearest G-E Apparatus Sales Office or write for Bulletin GEA-5984. General Electric Co., Sect. 658-19, Schenectady, New York.

Engineered Electrical Systems for the Rock Products Industry

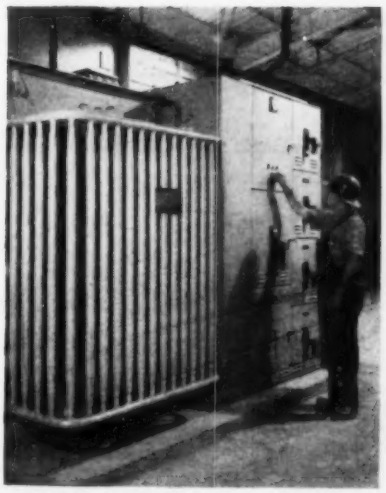
GENERAL ELECTRIC



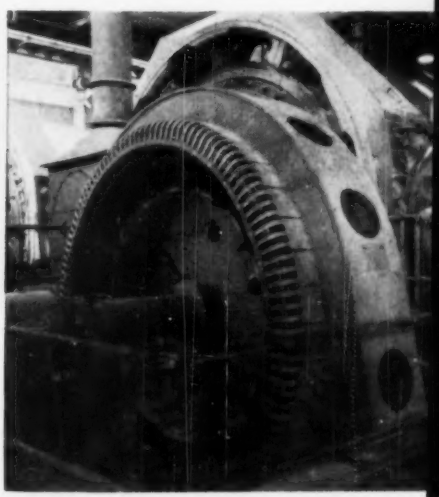
6 **STURDY,** totally-enclosed fan-cooled G-E 250-hp Tri-Clad induction motor drives the tough-duty coal mill in the Brennan Ave. plant kiln department.



7 **PROTECTED** against weather, this totally-enclosed, wound-rotor induction motor provides drive for rotation of 11½ by 425-foot kiln—Michigan's largest.



8 **LIFE EXPECTANCY** of 440-volt equipment is increased by solidly grounding neutrals for this 1000-kva load center, one of five that serve plant.



9 **PROPERLY CHOSEN** to match mill starting torque needs to supply system stiffness, this G-E 1000-hp, 240-rpm synchronous motor drives finish mill.

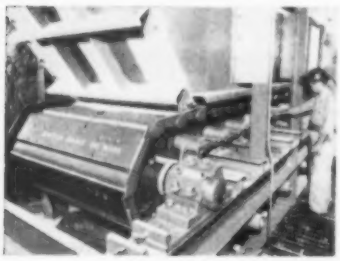
STEPHENS-

the BIG NAME

Pit and quarry operations are the roughest, toughest, testing grounds in the world for mechanized equipment. Here's where you'll find those big burly S-A engineered conveying systems proving their real quality. Here they take terrific punishment, absorbing shock, resisting vibration and abrasion, yet delivering tremendous tonnages. And they come back for more year after year. This is where the system has got to be good or be pounded into submission fast.

These are the conditions under which STEPHENS-ADAMSON has earned its big name. It's where over fifty years of experience and sheer excellence of engineering and product design pays off.

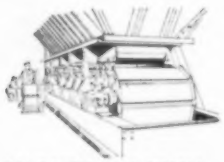
A STEPHENS-ADAMSON sales engineer is in your area. He is always ready to serve you and prove that the rock handling problem doesn't exist that can't be solved the S-A way.



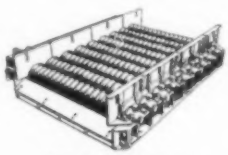
S-A builds feeders in many styles and sizes to meet any rock handling requirement. They range from heavy duty AMSCO feeders to rotary feeders for pulverized materials.

A wide selection of bucket elevator designs and sizes are available to convey rock products from lower level operations at various angles of incline for practically any loose bulk material.

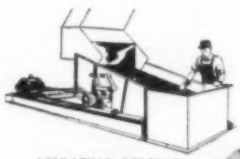
S-A screens are made in numerous types—vibrating—revolving—shaking—for screening, scalping, and washing crushed stone or gravel. S-A engineers can recommend the best designs for your own needs.



MANGANESE STEEL FEEDERS



LIVE ROLL GRIZZLIES



VIBRATING SCREENS

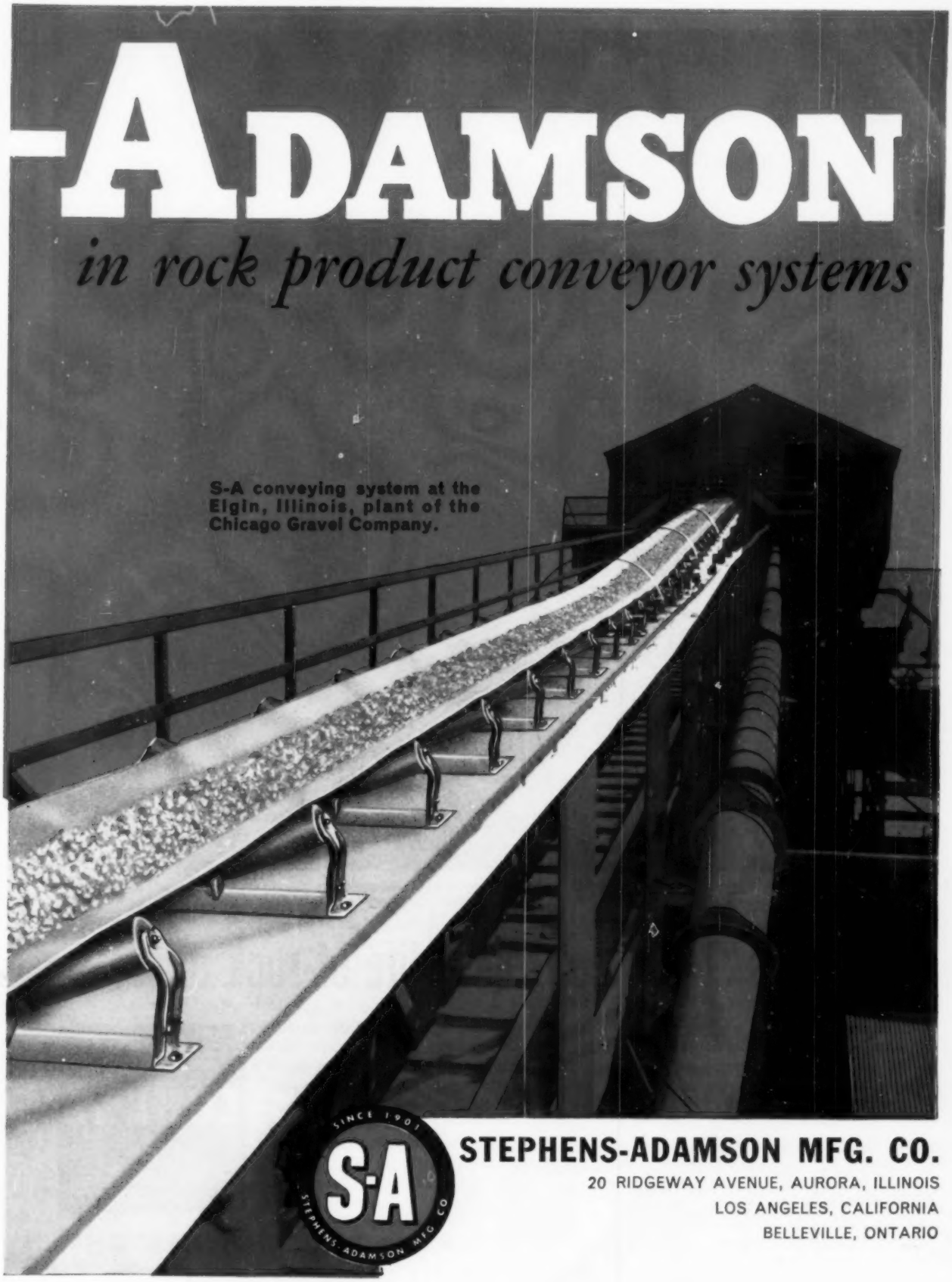
S-A manufactures a wide range of material handling products in three complete plants in U. S. and Canada.

- Belt Conveyors
- Belt, Pan & Plate Feeders
- Ship Loading Boom Conveyors
- Stacking Conveyors
- Storage & Reclaiming Systems
- "Natural Frequency" Vibrating Conveyors
- REDLER Conveyor-Elevators
- ZIPPER Conveyor-Elevators
- Conveyor Belt Cleaners
- Headshaft Holdbacks
- Grizzlies & Screens
- Centrifugal Pilers
- Bin Gates & Tunnel Gates
- Car Pullers & Spotters
- Bucket Elevators
- Skip Hoists
- SEALMASTER Ball Bearing Units

• *Write for a bulletin on any of the above products.*

-ADAMSON

in rock product conveyor systems



S-A conveying system at the Elgin, Illinois, plant of the Chicago Gravel Company.

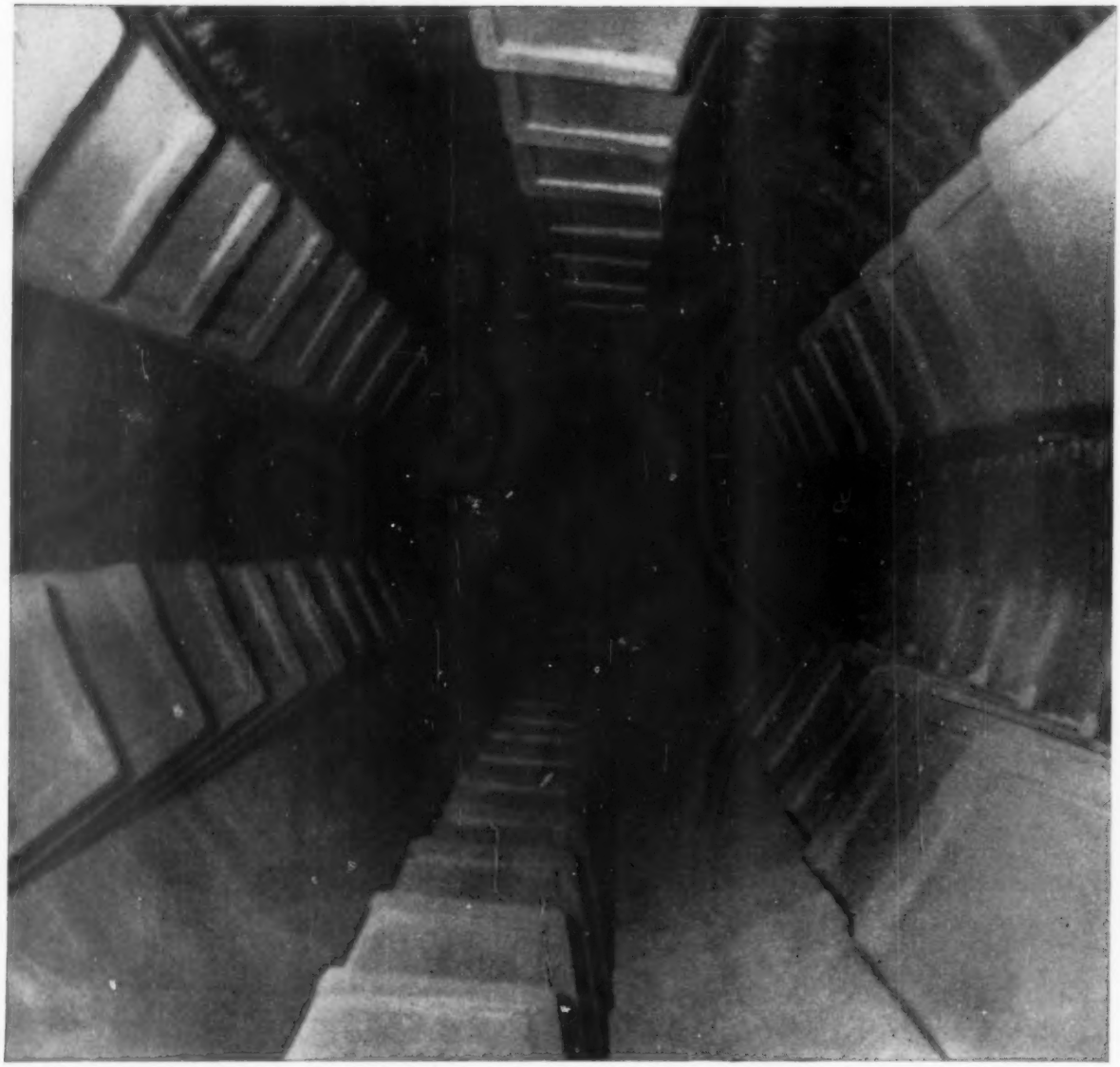
SINCE 1901 S-A STEPHENS-ADAMSON MFG. CO.

STEPHENS-ADAMSON MFG. CO.

20 RIDGEWAY AVENUE, AURORA, ILLINOIS

LOS ANGELES, CALIFORNIA

BELLEVILLE, ONTARIO



Carbon steel formerly used in this Simplicity aggregate drier wore out from smashing impact after handling 1¼ million tons of crushed dolomite but life expectancy is now over 4 million tons. Drier operates in one of the plants of The J. E. Baker Co.

Lukens "T-1" steel triples life of rock drier

TRADEMARK

Are impact and abrasion shortening the life and rocketing the costs of your equipment? If so, there's a lesson here for you:

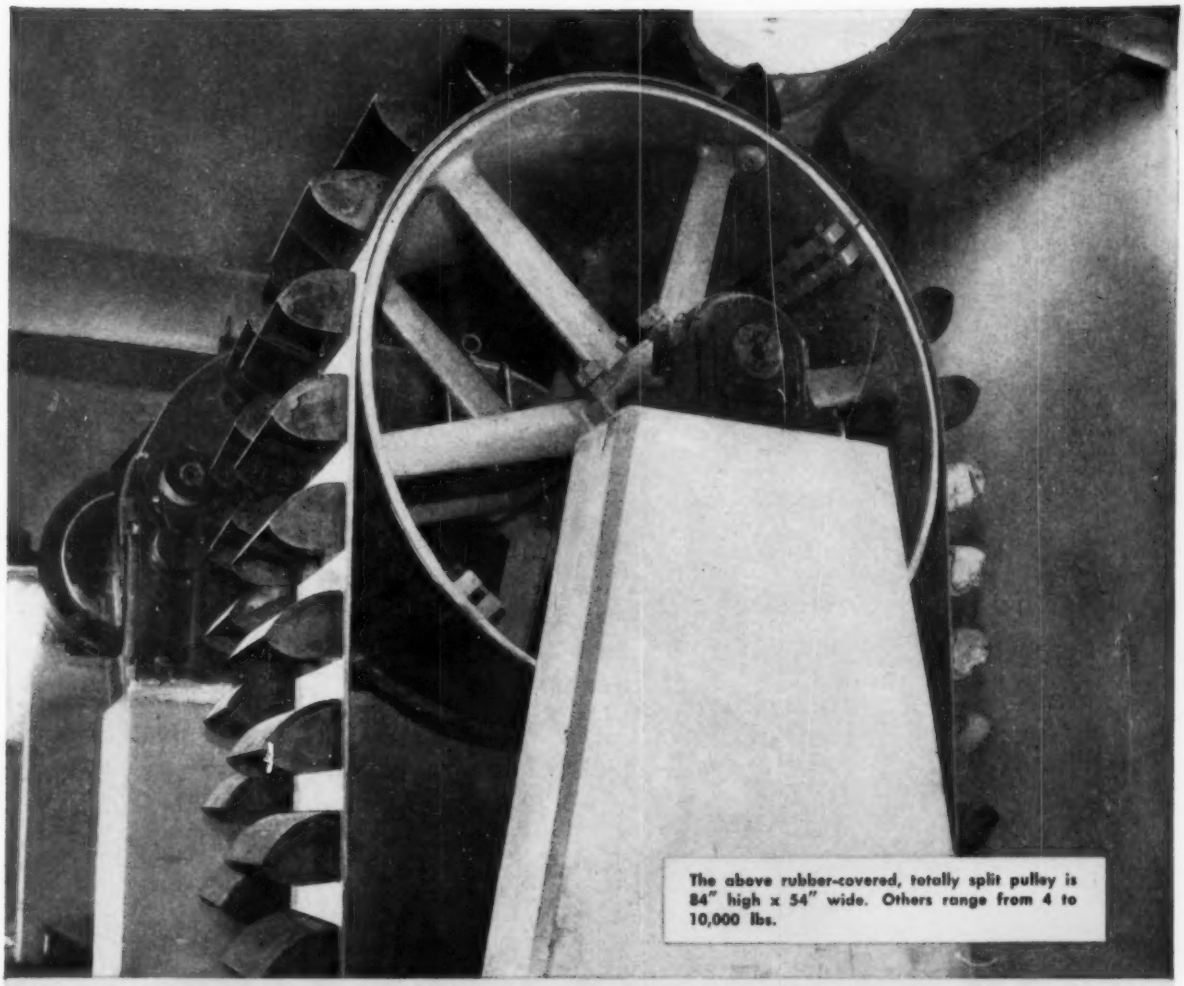
When the liner shell and partition plates of this 10 x 20 foot Simplicity aggregate drier were replaced with Lukens "T-1" steel, life expectancy increased threefold!

Whether you handle stone, coal, or metal ores, it will pay you to investigate Lukens "T-1" steel for surfaces hard-hit by impact and abrasion. The 321 minimum Brinell quality has been known to outlast ordinary steels by 18 to 1. Applications are many throughout the materials handling and processing industries. Wear plates, chutes, hoppers, and mine cars are typical.

The remarkable combination of hardness and toughness in this high yield strength, readily welded alloy steel is even maintained at temperatures well below zero. *Send for informative illustrated booklet, "Lukens 'T-1' Steel." Write Manager, Marketing Service, Room 903, Lukens Steel Company, Coatesville, Pennsylvania.*

LUKENS ®

Helping industry choose steels that fit the job



The above rubber-covered, totally split pulley is 84" high x 54" wide. Others range from 4 to 10,000 lbs.

Above pulley is one of eight installed in Chicago Regional Port District Elevators—James Stewart Corp. designer and builders.

EHRSAM PULLEYS

PERFORMANCE TESTED, NEVER BESTED

Grain elevator operators can show you Ehrsam pulleys that have been in service for more years than anyone can remember.

Performance like this doesn't just happen. It comes from pulleys made to the exacting specifications of each job. From true bore, perfect balance, flawless castings.

The grain elevator head pulleys pictured above are made of close grained, tough and enduring Micrometal iron—a development of Ehrsam metallurgical research combining technical and foundry experience going back 84 years.

Ehrsam does not stock pulleys. But when you order from Ehrsam, your requirements get more personal attention than you'll get from a London tailor.

We make standard, solid and split hubs, single or double arm, solid or totally split pulleys. Our pattern shop boys average 15 years experience. Our molders average 25 years experience. Our foundry capacity is 40 tons of micrometal castings per day.

Write us your specifications for a quotation.

WE INVITE YOU TO CHECK OUR DISTRIBUTOR AND O. E. M. DISCOUNT SCHEDULES.

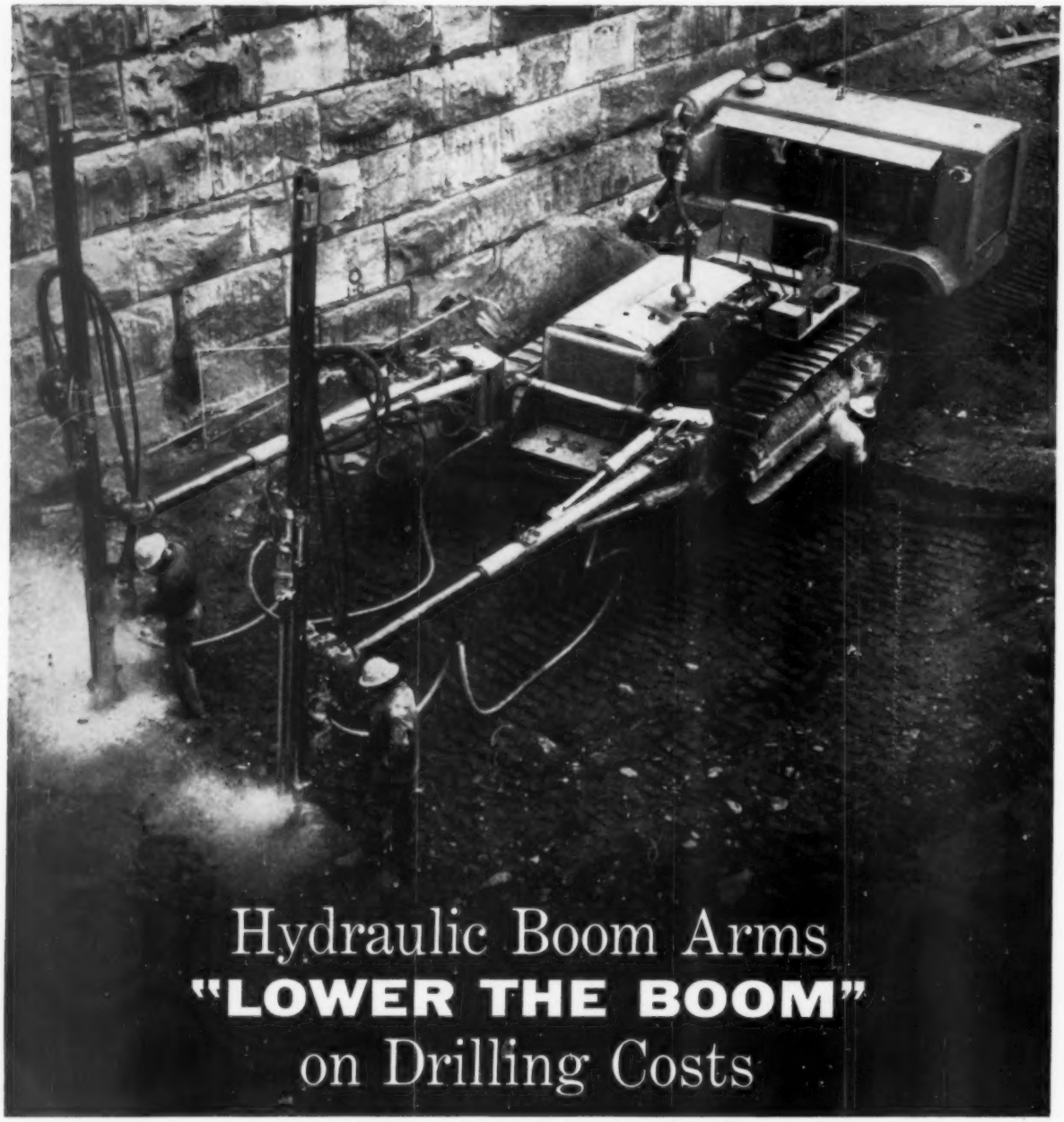
Over 80 years of dependable Service

EHRSAM®

THE J. B. EHRSAM & SONS MFG. CO. / *Dept. Q, Enterprise, Kansas*

SALES OFFICES: Denver, Colorado; Kansas City, Kansas.

WEST COAST: Ehrsam Pacific, Inc., Riverside, California.



Hydraulic Boom Arms "LOWER THE BOOM" on Drilling Costs

H-Booms have extra-capacity, double-acting hydraulic cylinders that retract and extend, swing or elevate in a hurry—yet pressures are moderately rated. There's no creeping or drifting! Boom can be extended 6 feet . . . that's an extra foot of length to afford better spacing of holes and greater area coverage without moving the rig.

Heavy-duty, Chicago Pneumatic H-Booms can be easily mounted on mine car, track or rubber-tired jumbos. It's a highly productive drilling unit when used on your old tractor. Write for more detailed information. *Chicago Pneumatic Tool Company, 8 East 44th Street, New York 17, New York.*

Chicago Pneumatic 8 East 44th Street, New York 17, N. Y.

PNEUMATIC TOOLS • AIR COMPRESSORS • ELECTRIC TOOLS • DIESEL ENGINES • ROCK DRILLS • HYDRAULIC TOOLS • VACUUM PUMPS • AVIATION ACCESSORIES

News of the Industry

Riverside Cement Project To Double Plant Capacity At Oro Grande, Calif.

An expansion program designed to increase finished cement grinding capacity by approximately 50 percent is underway at the Oro Grande, Calif., plant of the Riverside Cement Co., San Francisco.

Two new grinding mills and auxiliary equipment will be added. The new 12- by 17-ft. mills are driven by 1,250 hp. motors through F. L. Smidth Symetro gears. They will be supported on a single, centrally-located tire aided by balancing antifriction bearings on the drive shaft, at the discharge end of the mill.

New facilities for the packing, loading, and shipping of bulk cement and sacked cement are also under construction.

The work, which is being performed by the Fluor Corp., Ltd., Los Angeles, is scheduled for completion next fall.

$1,500,000 Expansion Begun At Olympic Portland Cement

Beginning stages of construction on the $1,500,000 expansion program of the Olympic Portland Cement Company, Seattle, Wash., are under way with the placing of concrete for the big, new rotary kiln and the erection of a 225-ft. reinforced stack.

Built by the Rust Engineering Company, the stack is 22½ ft. in diameter at its bottom, resting on an octagonal base 5½ ft. deep and 40 ft. across. Below the octagonal base are 77 reinforced concrete piles, 20 ft. deep.

The stack required 325 cu. yd. of concrete, in addition to the 225 cu. yd. of concrete underground. Lind Gravel Company supplied the concrete.

Distribution Center Opened By Basic, Incorporated

Basic Incorporated, Cleveland, Ohio, has completed its new distribution center which was built at Hammond, Ind., to facilitate the delivery of basic refractories in the Chicago area.

Bulk storage facilities consist of eight self-cleaning bins with a combined capacity of 1,000 tons. The adjacent warehouse accommodates 250 tons of bagged refractory products. Special equipment was installed to expedite rail as well as truck loading.

Coming Events

July 18-19, 1957—Hot Springs, Va. Directors' meeting, National Crushed Stone Association. The Homestead.

July 29 - August 2, 1957 — San Francisco. World Conference on prestressed concrete and third annual meeting, Prestressed Concrete Institute. Fairmont Hotel.

August 25-31, 1957—Murray Bay, Canada. Semi-annual directors' meeting, National Sand and Gravel Association and National Ready Mixed Concrete Association. Manoir Richelieu.

September 9-12, 1957—Salt Lake City. American Mining Congress; 1957 Metal Mining and Industrial Minerals Convention.

October 9-11, 1957—New York. 40th annual meeting, National Slag Association. Plaza Hotel.

October 15-18, 1957—White Sulphur Springs, W. Va. Fall meeting, National Industrial Sand Association. The Greenbrier.

October 15 - 18, 1957 — Tampa, Fla. Annual meeting, Society of Mining Engineers, and Southeastern States Mining Conference. Hotel Hillsboro and Hotel Tampa Terrace.

Ideal Cement Co. Erects Temporary Terminal at Site In Yolo County, Calif

The Ideal Cement Company, Denver, Colo., has put into operation a temporary terminal on the Sacramento River levee at the end of F Street in Broderick, Yolo County, Calif. The facility will be used until a highly mechanized permanent plant is completed early next year. It will represent an investment of over $1,000,000.

Cement from the company's plant in Redwood City is being transported in bulk form by barge to the Yolo outlet. It is pumped to storage bins through a pipe system, then fed into trucks *via* two large hoppers. Screw and blower conveyor systems are used to carry the cement ashore from the barge.

In addition to facilities for handling bulk cement, the permanent plant will be equipped with packaging machinery.

California Portland Cement Expansion Nears Completion

Completion of an expansion program at the California Portland Cement Company plant, located between Tehachapi and Mojave, Calif., will make the multimillion-dollar facility the third-largest of its kind in the world, according to John Lewton, assistant plant superintendent.

First of the three additional kilns goes into operation this month. The other two kilns will be in operation by August, increasing the plant's daily capacity to approximately 70,000 bags of cement. Present output of the plant is about 38,000 bags daily.

Plans also call for the installation of a special closed-circuit television relay throughout the plant's crushing system to facilitate the maintenance of a constant check on operations.

Giant Portland Cement Company, Philadephia, Pa., reports net sales of $14,724,929 for the year ended March 31, 1957, compared with $15,013,678 for the preceding year. Profits after taxes totaled $2,386,777, against $2,273,087 in 1956.

April Construction Drops 9 Percent Below 1956 — 4-Month Totals Unchanged

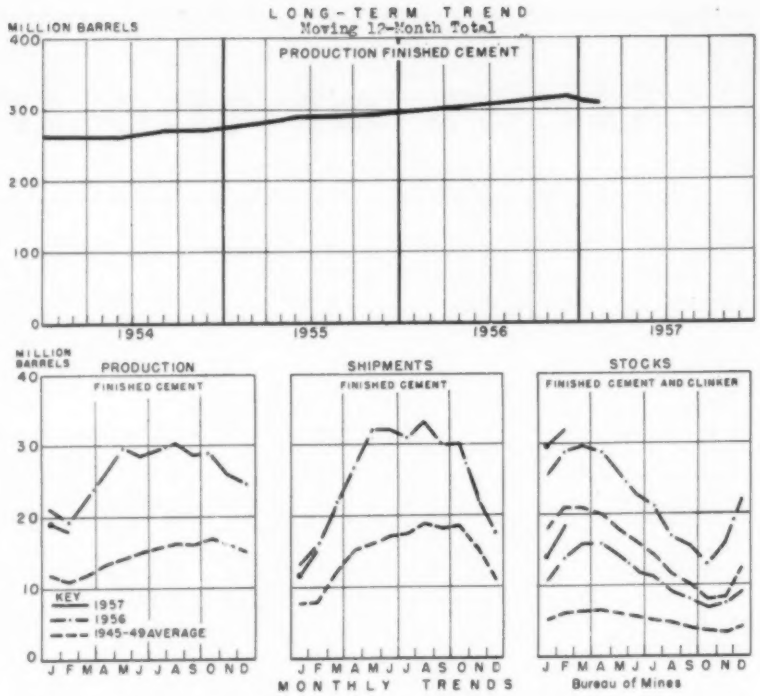
Contracts for future construction in the United States in April totalled $2,776,431,000, a decline of 9 percent compared to April, 1956, according to F. W. Dodge Corporation, construction news and marketing specialists. The April decline offset a large increase in March and, as a result, the cumulative total for the first four months of 1957, amounting to $10,314,991,000, showed no change from the comparable period of 1956.

Contracts for non-residential building, which were a major source of strength during the first three months of this year, amounted to $838,065,000 in April, down 20 percent from the corresponding month a year earlier. Nearly all components of the non-residential category shared in the decline with the largest decreases taking place in manufacturing and public building. For the first four months of this year, non-residential contracts totalled $3,664,712,000, about equal to the comparable period of 1956.

Contracts for residential building in April were valued at $1,231,667,000, 8 percent below the 1956 level. For the first four months of 1957, residential construction contracts amounted to $4,031,007,000, down 6 percent from the comparable period last year. The number of housing units represented by the April, 1957, contracts totalled 93,758, which was 14 percent below the April, 1956, level. The trend toward larger and more costly homes accounts for the sharper decline in unit volume than in dollar value.

The dollar value of heavy engineering contracts in April was $706,699,000, an increase of 8 percent over April, 1956. A substantial rise in the utilities category more than offset a small decline in contracts for public works construction. Heavy engineering contracts, from January through April, were valued at $2,619,272,000, up 12 percent over the comparable period last year.

Commenting on the figures for the first four months of this year, Thomas S. Holden, Dodge vice-chairman, said, "The year's record thus far seems to indicate a levelling off at the very high rates of 1956. If this trend continues, total construction activity in 1957 will run very close to the all-time highs set last year."



SUMMARY—Production of finished portland cement in February, 1957, as reported to the Bureau of Mines, U. S. Department of the Interior, totaled 17,860,000 bbl., a decrease of 9 percent from February, 1956. Mill shipments in February, 1957, totaled 15,116,000 bbl., a decrease of 5 percent compared with February, 1956. Stocks of 32,390,000 bbl. of finished portland cement on hand February 28, 1957, were 12 percent more than those on hand February 29, 1956. Clinker production during February, 1957, totaled 22,313,000 bbl., a decrease of 4 percent from the February, 1956, figure.

PRODUCTION—One hundred and fifty-six (156) plants (excluding 6 inactive plants) in 37 states and Puerto Rico reported a production of 17,860,000 bbl. of finished portland cement during February, 1957, compared with 19,578,000 bbl. produced by one hundred and fifty-five (155) plants in February, 1956.

Clinker production during the month of February, 1957, was 22,313,000 bbl., compared with 23,131,000 bbl. during the same month last year.

Production of high-early-strength portland cement in February, 1957, totaled 1,372,000 bbl., an increase of 4 percent over the February, 1956, production.

Production of prepared masonry cement was 919,000 bbl. during February, 1957, a decrease of 3 percent from the February, 1956, production.

SHIPMENTS—Mill shipments of finished portland cement for February, 1957, totaled 15,116,000 bbl., compared to 15,929,000 bbl. in February, 1956.

In February, 1957, shipments were higher in seven (7) districts and lower in sixteen (16) districts than in February, 1956. The greatest increases were in the Colorado-Arizona-Utah and Wyoming-Montana-Idaho districts. The greatest decreases were in the Iowa and the Michigan districts.

Mill shipments of high-early-strength portland cement in February, 1957, totaled 828,000 bbl., an increase of 10 percent over the 756,000 bbl. shipped in February, 1956. Over half of these shipments were from mills in three (3) districts, eastern Pennsylvania-Maryland, Michigan, and Alabama. No shipments were made from mills in Puerto Rico.

Mill shipments of prepared masonry cement in February, 1957, totaled 753,000 bbl., a decrease of 9 percent from the 823,000 bbl. shipped in February, 1956. Over half of these shipments were from mills in the northern states east of the Mississippi River. Prepared masonry cements are shown in 376-lb. barrels although they are sold in barrels of varying weights.

STOCKS—Mill stocks of 32,390,000 bbl. of finished portland cement were on hand February 28, 1957, an increase of 12 percent over the 28,939,000 bbl. on hand February 29, 1956. Stocks of clinker increased 33 percent from 13,873,000 bbl. on February 29, 1956, to 18,482,000 bbl. on hand February 28, 1957.

Construction Case Histories Covered in New Brochure

A new brochure outlining current information on drilling, blasting, and excavating methods used by the quarrying, and mining, and construction industries, has been published by the Explosives Department of American Cyanamid Company.

Entitled *Construction Case Histories*, the bulletin unfolds into a three page chart which presents 48 detailed construction case studies in condensed data form for rapid reading and reference.

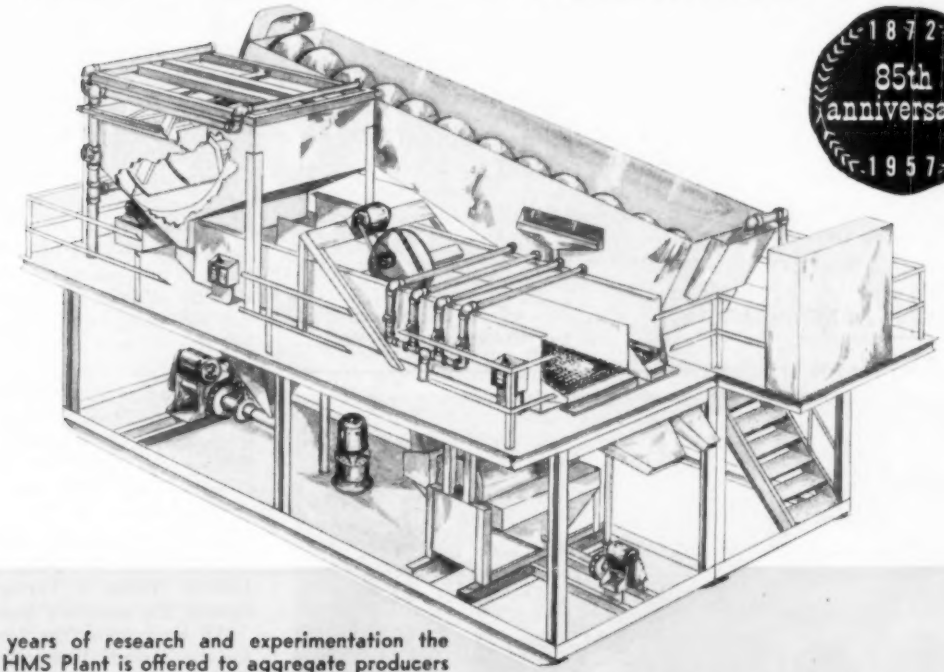
Copies of this brochure may be obtained from the American Cyanamid Company, Explosives Department, 30 Rockefeller Plaza, New York 20, N. Y.

Something new

IN HEAVY MEDIA SEPARATION

Eagle Iron Works now offers the OCC Separatory Vessel in a Compact, Efficient HMS Plant to Producers in the Sand and Gravel, and Crushed Stone Industries.

- √ ASSURES YOU SUBSTANTIAL ADVANTAGES IN OPERATION EFFICIENCY,
- √ ECONOMY OF OPERATION AND INSTALLATION,
- √ BEST SEPARATION THROUGH MOST PRODUCTIVE POOL AREA OCC VESSEL.



1872 85th anniversary 1957

After years of research and experimentation the Eagle HMS Plant is offered to aggregate producers exclusively with separation problems that cannot be solved by the usual methods. The Eagle HMS Plant provides these advantages: *Pre-assembled at the factory into four easily connected units. Transportable in four block sections. Employs screw densifier of Eagle design and use of other proven auxiliary equipment. Requires no expensive concrete sump. Employs the tried and true OCC Separatory Vessel which has proven itself in the mining industry.* Diagram shows typical Eagle 100 TPH HMS Plant layout.

A pilot plant is available to treat truck or carload quantities of material and to conduct laboratory tests based upon which Eagle engineers will submit recommendations concerning your needs.

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Oregon Portland Cement Raises Production 100% By Expansion Program

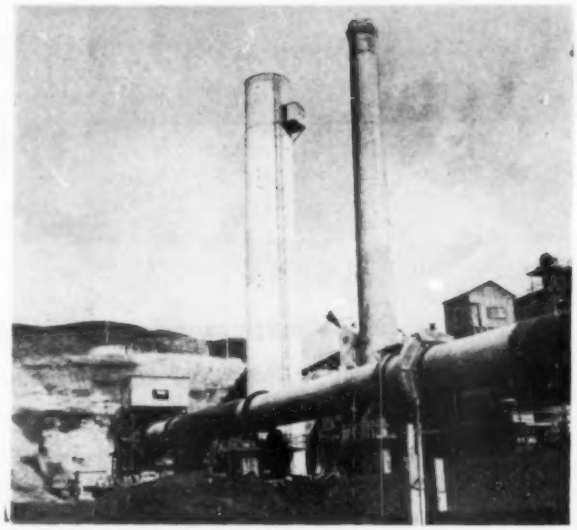
With the completion of a comprehensive expansion and modernization program, a production increase of 100 percent has been effected at the Lime, Oreg., plant of the Oregon Portland Cement Company.

Involving an expenditure in excess of $3,000,000, the year-long enlargement and improvement schedule now gives the Lime plant an annual production of 1,000,000 bbl.

Construction at Lime includes a new 350-ft. kiln with a complete clinker cooling system, a new stack, a new raw-grinding mill, new slurry basins, and a new finish-grind mill.

Quarry facilities have been expanded in order to handle efficiently the added volume of rock needed for greater production. New quarry machinery includes a P & H shovel, two large Euclid trucks, and an Ingersoll Rand Drillmaster.

Oregon Portland Cement owns extensive property containing large quantities of high-grade lime rock adjacent to its plant.



A view of the new 150-ft. stack and a portion of the new kiln installation at the Lime, Oreg., plant of the Oregon Portland Cement Company. The old stack is to be removed.

Consolidated Rock Products Honors 202 Safe Drivers

Herding huge, heavy-laden trucks over the streets and highways in and around Los Angeles looks like a trying experience to the observer.

Yet, drivers for Consolidated Rock Products Company, operating one of the largest fleets in the industry, have hung up an enviable safety record.

Out of a total of 293 drivers, 202 received awards for driving without an accident of any kind for periods ranging up to 25 years. The awards were made at a yearly spring event staged by Consolidated—the Annual Drivers' Breakfast.

Thirty-one of the 202 earned gold buttons for 4-year safety records.

Lulu Island, B. C., Facility Being Erected by Lafarge To Open Early Next Year

Portland cement manufactured at the new Lulu Island plant of Lafarge Cement of North America, Ltd., is expected to be available to the construction industry in British Columbia early in 1958.

Construction of the $14,000,000 plant is proceeding on schedule, according to Jean C. Lofficier, executive vice-president of Lafarge.

Lafarge will operate deep sea wharf facilities at its plant site. The self-unloading barge bringing limestone from Texada Island and clay from its quarry near Matsqui on the Fraser River, as well as deep sea freights, will dock there.

Construction of the main plant is being handled by Commonwealth Construction Company, Ltd. McCarter, Nairne & Partners are designing the auxiliary buildings.

All equipment has been ordered for the Texada limestone quarry so that production can start early in October. About half the production of crushed limestone will be sold to various west Canadian pulp mills.

Equipment ordered includes three crushers (primary and secondary crushers supplied by Canadian Allis-Chalmers and a third by Pennsylvania), a Joy drill, a 1-cu. yd. Bucyrus shovel and two ¾-cu. yd. shovels, two 20-ton Euclid trucks, and Stephens-Adamson conveyor equipment and loading boom.

The Lulu Island plant will be the only one in North America to produce aluminous cement. Lafarge also manufactures the product, Ciment Fondu, in France, and at its plant near London, England.

• Marvin Mengle Jr.'s scale model of the Lehigh Materials Company's plant won first prize at the Tamaqua, Pa., science fair and an honorable mention award in the Lehigh Valley Science Fair in Allentown, Pa. Lehigh Materials manufactures "Lelite," a lightweight aggregate. Seen with the display are, left to right: W. F. Atkins, vice-president and sales manager of Lehigh Materials Company; Robert A. Hartwig Jr., principal of Tamaqua Junior High School, and Marvin Mengel Jr.

Paul Duncan Elected Vice-President, Director Of Marquette Cement

Paul Duncan has been elected vice-president and director of the Marquette Cement Manufacturing Company, Chicago, Ill. Mr. Duncan was formerly assistant secretary-treas-

Paul Duncan

urer of the company. His father, the late Stuart Duncan, had been chairman of the board for 23 years at the time of his death last year.

With the exception of a period spent in the Army during World War II, Paul Duncan's service with Marquette has been continuous since 1933, when he was graduated from the University of Notre Dame. Working his way up through the ranks, he was appointed comptroller in 1947, and elected assistant secretary and assistant treasurer in 1951. He will continue to perform the duties of those offices.

Railroad to Produce Ballast For Own Use at Wis. Quarry

The Chicago and North Western Railroad has purchased a site in south central Wisconsin which is said to hold sufficient quartzite rock to produce 30,000,000 cu. yd. of track ballast—enough to meet the railroad's requirements in the foreseeable future. The site is adjacent to the railroad's main line at Rock Springs, Wis., eight miles west of Baraboo and the Devil's lake region.

The quarry, nicknamed "the Pink Lady" because of the pink and lavender color given to the crystalline rock by small iron deposits, will be in production by late this summer.

FOR BIG POWER use Maxi-Power

1. Heavy duty, reinforced design housing for permanent alignment, rigid shaft support.
2. One mesh per reduction—fewer moving parts.
3. Broad faced helical gearing—high quality, accurately hobbed for greater strength, durability. Uniform tooth deflection under load . . . no uneven wear.
4. Shafts firmly held in place. Positive gear location assures full tooth engagement across entire face.
5. Smooth, overlapping mesh, close backlash tolerances, no oil trap, provide quiet operation, less heat generation.
6. Heavy duty, anti-friction bearings. Conservatively rated for wide range of operation.

Capacities to 1550 H.P.

★ Single, Double, Triple Reductions
★ Standard Ratios from 2.08 to 1 up to 360 to 1
★ 9 Shaft Arrangements

There's more capacity, greater stamina and longer service life built into Foote Bros. Maxi-Power Parallel Shaft Drives. Simple, balanced design, fewer moving parts, heavy duty construction, efficient lubrication and conservative ratings make Maxi-Power drives the logical choice for critical applications and severest operating conditions.

You can depend on Maxi-Power Drives to produce maximum performance with minimum attention because they're built for just that kind of service.

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Better Power Transmission Through Better Gears

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4571 South Western Boulevard Chicago 9, Illinois

Magnified view shows how the Dayton Cog-Belt bends as easily as your finger, without excessive stress or strain, even on the smallest sheave. Cogs take up the bending action where the belt goes around the sheave; raw-edge sides give maximum co-efficient of friction—two reasons why Dayton Cog-Belts deliver more power, save more money!

"Running twelve hours a day, 7 days a week," says Chief Storekeeper Dom White, "This set of Dayton Cog-Belts has been on our 24" gyrasphere crusher—*for over two years*. Dayton Cog-Belts 'kick-out' dust that used to collect in the V-grooves . . . they seem to thrive on grit and dust that tears the covers off other belts in a day."

PREVENTIVE MAINTENANCE REPORT:

Abrasive Dust Problem Ended by Dayton Cog-Belts*. . .

Saving $840 in V-Belts Alone for The Diamond Portland Cement Co., Middle Branch, Ohio

"Severe abrasive conditions were making belt replacement a real headache at our primary crusher site," says the Chief Storekeeper for The Diamond Portland Cement Co. "Every time I'd see a tag on the crusher, my reaction would be 'What, another set of belts?'

"We found grit and abrasive dust from our 24" gyrasphere crusher and from the surrounding atmosphere was tearing the fabric off ordinary belts . . . cutting the reinforcing cords . . . and wedging in the belt groove — eventually causing the sheave to throw the belt. Some belts wore out in only 24 hours.

"The cost of keeping a drive on the crusher was discouraging. In 1953 we spent $255 on belts alone — as well as having the crusher down for belt replacement on 8 different occasions during which production stopped.

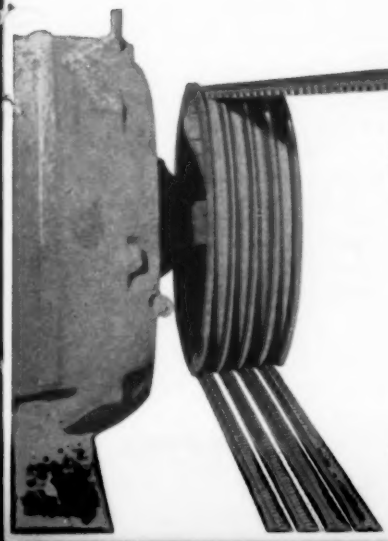
"A lot of people had offered to help us, but none of their solutions worked. When the Dayton representative called, we were skeptical. But, we had spent so much time and money trying to find a solution that we had to give him a chance.

"He asked us to try Dayton Cog-Belts. We did, and they were an immediate success. By eliminating our basic problem . . . the build-up of abrasive grit between the groove and the belt . . . we eliminated all the other problems we *thought* we had! What's more, we've saved about $840 while doing it!

"For, the special cog design doesn't allow abrasive particles to build up in the belt grooves. Faster than the dust can collect, the openings in the Dayton Cog-Belt kick it out. With no dust collecting, there's nothing to distort the shape of the belt or force it to fly out of the sheave.

"Even more important is the fact that Cog-Belts practically *gobble up* abrasive dust. With a fabric covered belt, abrasive material which was forced into the surface would wear and cut the fabric, causing it to tear and split. The Cog-Belt has no fabric on the driving surface — just bare rubber. Instead of abrading the Cog-Belt, clinker, dust or iron grit becomes imbedded in the uncovered rubber and stays there dormant as an integral and harmless part of the belt.

"These Cog-Belts have been running unattended for over 2 years—operating 12 hours a day, 7 days a week," concludes Mr. White. "Their positive drive, extremely uniform wear pattern, and durability, add up to the most trouble-free operation we've experienced. And, this drive was once a major trouble spot."



For more information and help in solving your power transmission problems, see "Belting" in the Yellow Pages for the name of your nearest Dayton distributor. Or, write The Dayton Rubber Co., Dayton 1, Ohio.

Dayton Rubber

World's Largest Manufacturer of V-Belts

Dayton Rubber Company, Industrial Replacement Division, Dayton 1, Ohio

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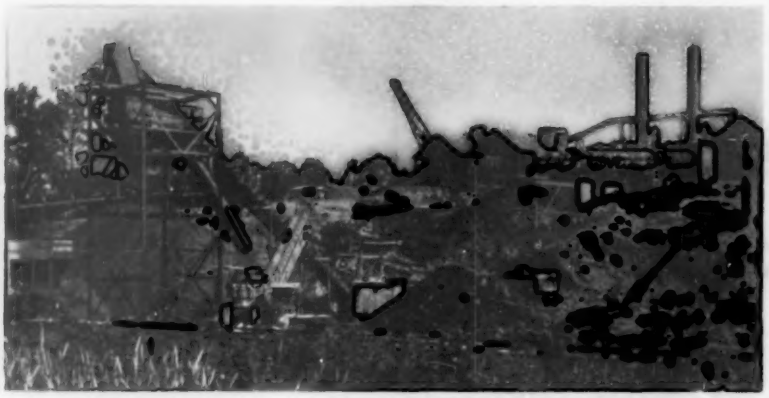
*T.M.



• On June 1 the third Solite plant in the Virginia-North Carolina area was dedicated at Leaksville Junction, Va., by the Southern Lightweight Aggregate Corporation, Richmond. Twin kilns, 135 ft. long, (foreground) are used in expanding the crushed slate from which Solite is made.

Israeli Cement Output Reduced 50 Percent in '57 Because of Increased Price

Israel's cement plants will reduce their output to 50 percent of normal (or to between 300,000 and 400,000 tons) this year as a result of a marked fall in export demand, due to higher prices. The increased cost of fuel oil on which Israel's power production is based forced the industry to raise the price of cement.

Actual output will be determined largely by home market demand, chiefly on the part of governmental or government-supported building companies.

The Israeli Government intends to build approximately 10,000 housing units in 1957 to provide accommodations for the major part of the 75,000 to 100,000 newcomers expected this year, but the realization of the full program is doubtful in view of the government's strained financial position.

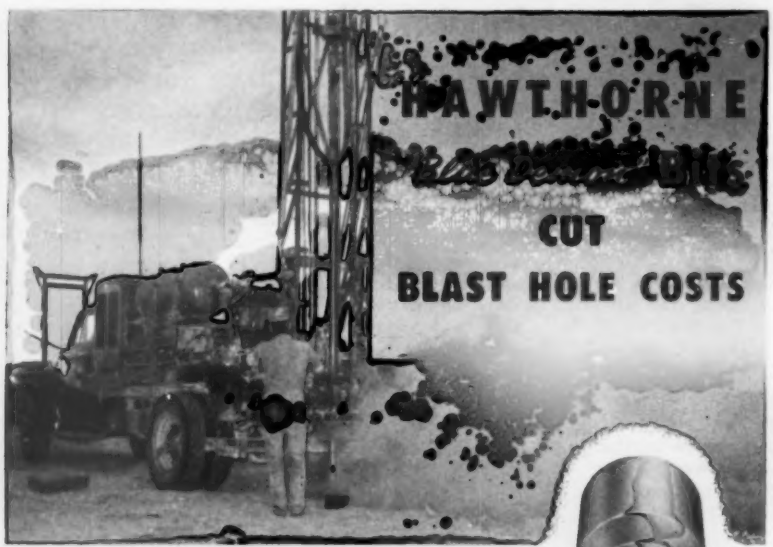
The industry's total capacity is over 800,000 tons, but production in 1956 approximated only 650,000 tons, of which 190,000 tons were sent abroad, mainly to the United States, 80,000 tons; Turkey, 50,000; Nigeria, 22,000; Ethiopia, 11,000; and Cyprus, 10,000.

Natl. Safety Council Leaflet Outlines Seven Safety Steps

Safety is just good business—and it's easy if seven basic steps are followed, according to the National Safety Council. The steps are included in a leaflet, *Seven Steps to Safety*, a digest of the Council's previously published booklet, *Plus Costs of Accidents*.

Safety experts have viewed the new leaflet as a concise statement of principles of industrial safety, which are as follows: (1) insist on safety, (2) assign someone to help on details, (3) locate trouble spots, (4) make the job safe, (5) control unsafe habits, (6) keep simple records, and (7) get employees into the act.

Single copies of *Seven Steps to Safety* may be obtained on request from the Small Business Program, National Safety Council, 425 N. Michigan Ave., Chicago 11, Ill.



SERIES "700" WITH BREAK-OUT LUGS SIZES 3⅞"-5⅝" FOR HEAVY DUTY ROTARY AIR DRILLING CUTS HOLE TIME

Rotary air drilling, with Hawthorne "Blue Demon" Series "700" Carbide Insert Bits, has been increasing drilling speeds up to 50%, with progressively decreasing drilling cost per ton.

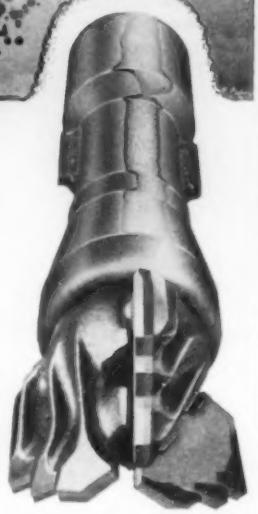
The Series "700", using carbide inserted replaceable blades, was designed for hard rock exploration air drilling on the Edwards Plateau and has proved equally successful in quarry type drilling in medium-hard and softer limestone and sandstone.

Many areas previously requiring more expensive roller bits are now successfully using Hawthorne "Blue Demon" Bits.

Break-out lugs facilitate rapid replacement of expendable worn blades, since quarry drilling requires frequent bit change.

Hawthorne's experience and reputation in efficient bit design and manufacturing quality in the field of resources exploration is now available to the blast hole drilling industry.

In average quarry drilling, you should check the possibilities of Hawthorne "Blue Demon" Carbide Bits for increased drilling efficiency.



Write TODAY for your FREE copy of "Blue Demon" Bit Catalog 656 which fully describes and prices the complete line of Hawthorne Bits in sizes from 1⅞" through 13", and for recommendations for your specific drill.

HERB J. HAWTHORNE INC.

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Why tough-service drive and conveyor jobs demand LINK-BELT roller chain

RESISTANCE TO TENSILE STRESS is achieved with properly heat-treated, accurately machined side bars made of premium steel and fitted with properly hardened pins, bushings, rollers.

STRENGTH OF CHAIN IN MOTION results from such refinements as pitch-hole preparation, micro-finish of parts, special processing of side bars, pre-lubrication, rigid quality control.

THE *greater dynamic strength* found in Link-Belt precision steel roller chain is essential for long life on today's harder-working drives and conveyors. This added capacity to resist shock loads, centrifugal loads and similar stresses is achieved only because Link-Belt adds refinements in manufacture.

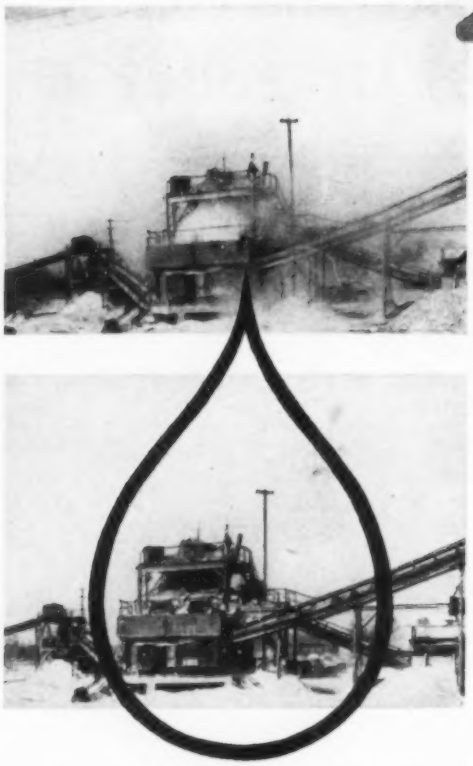
These include lock-type bushings, shot-peened rollers, pre-stressing, closer heat-treat control. The result: a precision chain that takes stresses in stride . . . provides smoother, more efficient performance that measurably outlasts ordinary roller chain — reduces costs.

For full data on Link-Belt roller chain, see your Link-Belt office or authorized stock-carrying distributor.

LINK-BELT

ROLLER CHAIN & SPROCKETS

LINK-BELT COMPANY: Executive Offices, Prudential Plaza, Chicago 1. To Serve Industry There Are Link-Belt Plants, Sales Offices, Stock Carrying Factory Branch Stores and Distributors in All Principal Cities. Export Office, New York 7; Canada, Scarboro (Toronto 13); Australia, Marrickville (Sydney), N.S.W.; South Africa, Springs. Representatives Throughout the World. 14.472



without enclosures, fans or collection bags . . .

THE CHEM-JET SYSTEM STOPS DUST AT THE SOURCE

With Chem-Jet dust control, the dust problem never gets off the ground—literally. Chem-Jet suppresses dust *before* it becomes airborne. A thin veil of specially treated, surface-active moisture applied at the dust-producing area stops even sub-micron sized particles.

Indoors or out . . . wherever bulk materials processing creates dust, a job-engineered Chem-Jet System can control it—at a surprisingly low cost.

Bulletin CJ-1 explains how an inexpensive Chem-Jet System can be designed around existing plant facilities to give you dust-free operation. A copy is yours for the asking.

Johnson March

DUST CONTROL ENGINEERS

1724 Chestnut Street, Philadelphia 3, Pa.

Texas Portland Cement To Expand Echo Facility At Cost of $2,500,000

Plans for a 150 percent expansion of production facilities at the new plant of the Texas Portland Cement Company, Echo, Tex., at an estimated cost of $2,500,000 were announced by Kent B. Diehl Sr., president.

Machinery to be added to the present plant facilities includes a second kiln, raw grinding mills, a finish grinding mill, and six additional silos purchased from the Kennedy-Van Saun Manufacturing and Engineering Corp., New York. Installation of the new machinery will increase the capacity of the plant from 2,000 to 5,000 bbl. a day.

Recently completed, Texas Portland Cement made its initial shipment of cement on April 5.

Mining Engineers to Meet In Tampa, Fla., Oct. 15-18

The annual meeting of the Society of Mining Engineers and the Southeastern States Mining Conference will be held October 15-18, 1957, in Tampa, Fla. Sponsored by the Florida Section, A.I.M.E., Society of Mining Engineers of A.I.M.E., the meeting will have its headquarters at the Hotel Hillsboro and the Hotel Tampa Terrace.

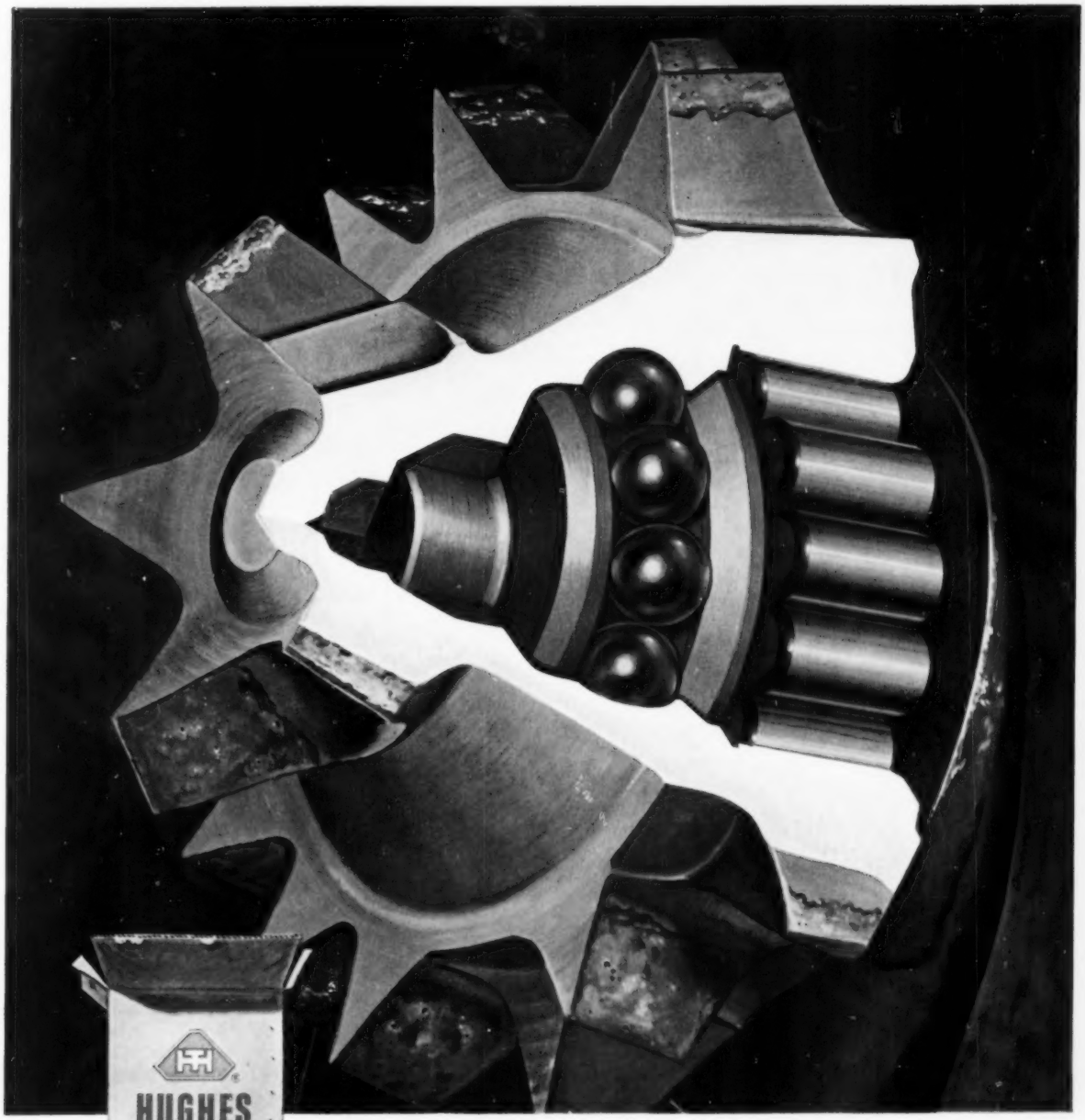
Four days of technical sessions and field trips will be highlighted by a tour through the Bone Valley phosphate mining field and processing centers adjacent to both Tampa and the heart of Florida's citrus-growing highlands. In addition, a program of social activities is planned.

Technical sessions will include 48 papers on mining, geology, minerals beneficiation, coal, and industrial minerals.

Advance registration forms may be obtained from B. P. Jones, Registration Chairman, Davison Chemical Co., Bartow, Fla.

The American Potash & Chemical Corporation, Los Angeles, Calif., is doubling the production capacity at its granular potash plant at Trona, Calif. This project, which will cost $750,000, is a part of the company's $3,500,000 improvement program at Trona.

Anton J. Tinkel of Claflin, Kans., has purchased C. R. Hardesty's sand and gravel business which includes all equipment and a gravel and sand pit in Ellinwood, Kans.



A STOUT HEART... for Longer Life

One of the big reasons you are today getting increased footage with Hughes rock bits is the improved quality of the bearings. The design and metallurgy of Hughes bearings have never been permitted to remain static.

Teams of product, research, metallurgical and field engineers are constantly evaluating designs and materials to determine the combinations that will deliver the best results. Aiding materially in this evaluation is the physical examination of the bearings of thousands of selected dull bits sent to the Research Laboratory each year from the various fields with their performance records.

The work of these engineers, backed by Hughes' nearly 50 years experience with rock bits, is being reflected in the continued improvement in bit performance.

Tru-Stop Brakes

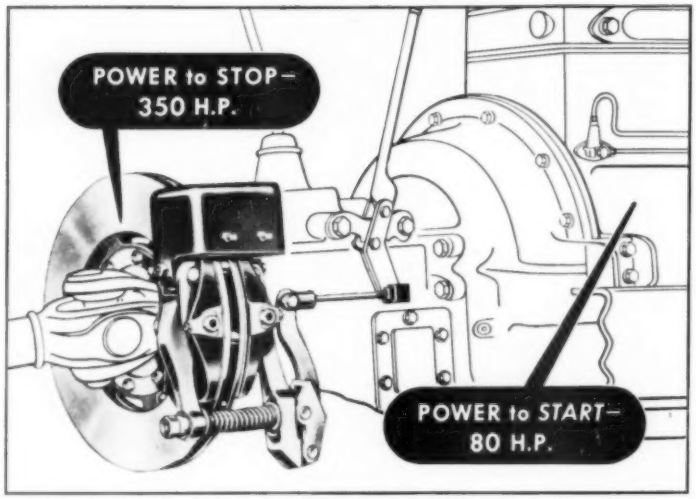
Meet Every Heavy-Duty Safety Requirement

OFFER POSITIVE PROTECTION AGAINST RUNAWAY OR PARKING ACCIDENTS—AT LOWEST COST

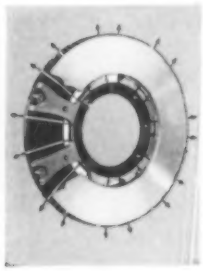
HERE IS WHY:

They have surplus power required for emergency service—no dangerous self-energizing

TRU-STOP Heavy-Duty Emergency Brakes are not only excellent parking brakes. They serve as a complete, independent and fully reliable braking system. Operating on the propeller shaft they enable the driver to continue on safely in the event of service brake failure. TRU-STOP brakes have the surplus braking capacity to be used *repeatedly* as an auxiliary to service brakes.

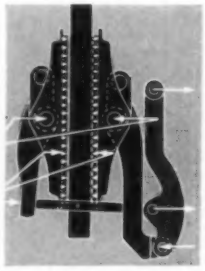


Brakes actually do more work than the engine in terms of horsepower Where it takes 80 HP to accelerate to 20 miles per hour, it takes 350 HP to make a safe stop from 20 miles per hour within required limits



Ventilated to throw off heat

Brake efficiency depends on ability to throw off intense heat —rapidly. Discs of TRU-STOP brakes are exposed to the air even during the braking operation. Ventilated design circulates air *between* the disc plates.

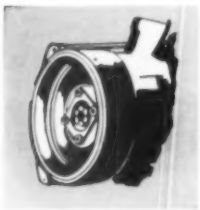


Give uniform brake pressure

Disc of TRU-STOP brakes is "squeezed" between the flat surface of the shoes. Effort applied to brake lever operates front and rear lever arms simultaneously. Pressure is exerted on the center of each shoe. Entire lining surface is in contact.

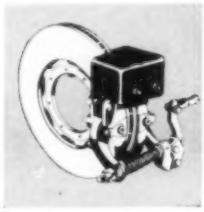
TRU-STOP HEAVY DUTY BRAKES OUTPERFORM AND OUTLAST DRUM-TYPE BRAKES

DON'T LET THE SURFACE AREA FOOL YOU!



Drum-type brake

43¼ square inches of lining. Lining covers 310 degrees of the drum. *BUT* only 50 degrees of the lining-covered drum is exposed to the air.



Tru-Stop brake

28 square inches of lining. 90 degrees of the disc under pressure. *BUT* 270 degrees of the disc is exposed to air. Directing and throwing off heat is basis of brake efficiency.

We will be glad to answer any questions or give you more detailed information about TRU-STOP Heavy Duty Emergency Brakes. Send for

Catalog DH 33

THE TEST

Drum-type Brake	*vs*	*Tru-Stop Brake*
After a few light and two heavy applications from 20 MPH, lining was useless for further test.		Repeatedly stopped vehicle from 50 MPH —was then used to decelerate on steep grades. No serious damage to lining.

Automotive and Aircraft Division
AMERICAN CHAIN & CABLE

601 Stephenson Building, Detroit 2
2216 S. Garfield Street, Los Angeles 22 • Bridgeport 2, Conn.

ACCO
TRADE MARK

New Construction In April Up 10 Percent Over '56—Total Outlays Set Record

The value of new construction put in place increased seasonally by 10 percent in April, 1957, to $3,500,000,000, according to preliminary estimates of the Departments of Labor and Commerce. With this advance, the overall spending rate for new construction remained slightly ahead of a year ago, and total outlays of more than $12,500,000,000 during the first four months of 1957 set a new record, up 2 percent over the total for the same period last year. Considering total private *vs.* public spending for new construction, the gain was entirely in the public segment, since total private outlays for both April and the first four months edged off slightly from last year's record.

The plateau in private construction activity has resulted mostly from the downward trend in housing and store building. The value of work put in place on new nonfarm dwellings in April was off by 14 percent from last year, and was down 11 percent for the first four months. Store building was 17 percent below a year ago in April and for the first four months. Industrial and most other types of private nonresidential building activity are still running well ahead of last year. Public utilities also represent an area of strength in the current private construction picture with substantial increases in their outlays for new facilities.

Medusa Issues Brochure Describing Ohio Turnpike Job

A new 12-page brochure entitled *Medusa Helps Build Ohio's Magnificent Miles* pictorially describes the Ohio turnpike, as well as the 55 buildings required for operations on the project. Published by the Medusa Portland Cement Company, the booklet tells of the firm's part in helping the Ohio Turnpike engineers and contractors finish the mammoth project by the projected completion date.

Medusa supplied 1,600,000 bbl. of cement, 773,000 of which were delivered within 4 months. This is believed to be the largest amount of cement ever delivered by one company on a single highway project in so short a time.

The folder also lists the more than 50 contractors who built the portland cement concrete pavement and bridges, and the contractors, architects, and engineers responsible for the service plazas, maintenance buildings, and administration building.

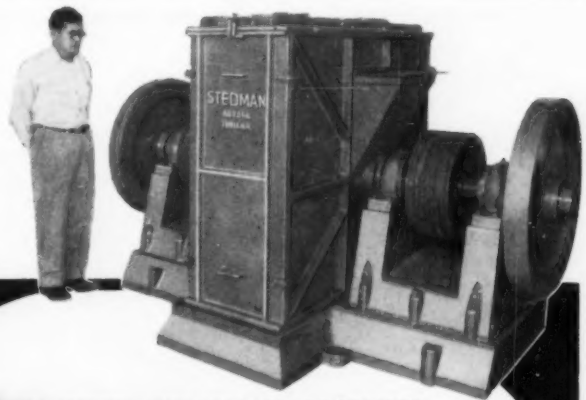
A complimentary copy of the brochure may be obtained from the Medusa Portland Cement Company, P. O. Box 5668, Cleveland 1, Ohio.

Cementos Alba, Madrid, Spain, has imported cement-producing equipment which is expected to double the firm's capacity to 200,000 tons per year. Cementos Alba began producing cement in March, 1956, and entered the market in June, 1956.

Limestone Processing Firm Installs Permanent Plant At Third Kansas Quarry

Concrete Materials and Construction Company, Cedar Rapids, Iowa, has installed a permanent plant at its quarry near Manhattan, Kans., for processing limestone. The operation is known as the Manhattan Quarry.

Production at the new plant is under the direction of Marvin Nelson, vice president in charge of production at the firm's headquarters. Ralph Wofersberger is superintendent of the quarry.



ARE YOUR STONE AND GRAVEL PRODUCTS CUBICAL IN SHAPE?

ARE THEY FREE OF SOFT STONE AND CLAY?

WILL THEY MEET SPECIFICATIONS AND PASS ABRASION TESTS?

DO YOU NEED MORE OF THE FINER SIZES IN YOUR SAND PRODUCTS?

CAN YOU MEET TODAY'S SPECIFICATIONS ON AG LIME?

STEDMAN CRUSHING EQUIPMENT

SOLVES MOST OF THESE PROBLEMS!

Write for complete details on the STEDMAN PRINCIPLE OF IMPACT CRUSHING to meet today's requirements.

MORE THAN A CENTURY OF KNOW-HOW

STEDMAN FOUNDRY AND MACHINE COMPANY, INC.

Subsidiary of United Engineering and Foundry Company

AURORA, INDIANA Founded 1834

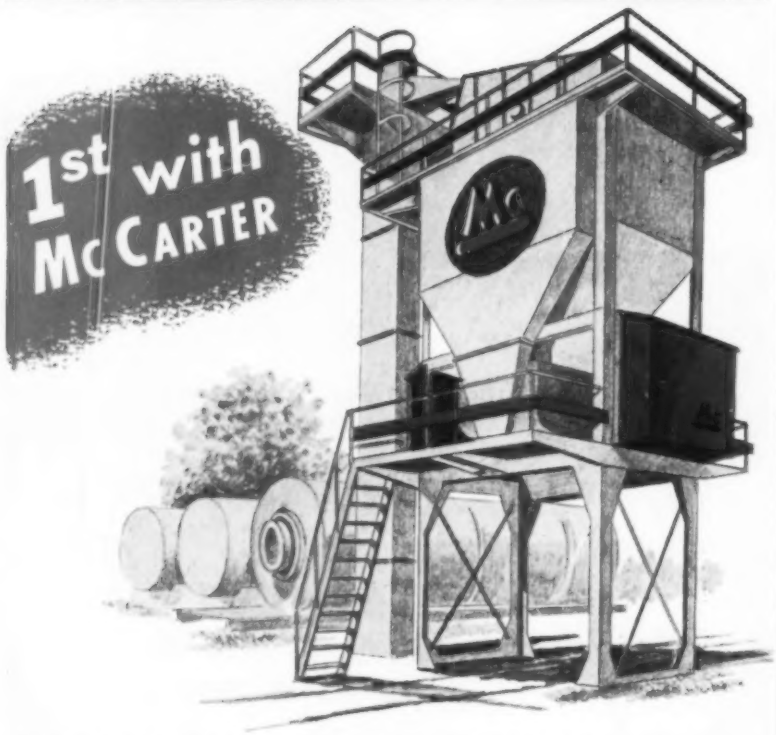
Michigan Limestone Div. Rechristens Two Vessels For Rogers City, Cedarville

Honoring two Michigan cities noted for their limestone output, the Michigan Limestone Division, United States Steel Corporation, has renamed two of its Bradley Transportation Line boats. The vessels are the *B. G. Taylor*, renamed the *Rogers City*, and the *A. F. Harvey*, which is now the *Cedarville*.

In conjunction with the rechristening of the *Taylor* on May 20, Michigan Limestone's calcite plant at Rogers City held an open house to exhibit what is reportedly one of the largest limestone quarry and processing plants in the world. The plant produces approximately 17,000,000 tons of limestone during the eight-month navigation season.

The *Harvey* was rechristened on May 25 at Cedarville, which is the home of the newly-opened Cedarville plant and its shipping point, Port Dolomite.

The Livingston Rock & Gravel Company will build a new batch plant, its fifth, in Gardena, Calif., to keep pace with the industrial growth in the southwestern part of the state.



A REVOLUTIONARY NEW ASPHALT PLANT

TOPS IN SPEED, PRODUCTION, PORTABILITY

Available as 100 to 130 T.P.H. stack-up type or 60 to 70 T.P.H. fully portable self-erecting installations

- MOST RUGGED PLANT ON THE MARKET . . . BUILT TO LAST.
- ENGINEERING COUNSELING AVAILABLE . . . NO OBLIGATION.

THE Mc McCARTER IRON WORKS, INC. NORRISTOWN, PA.

'56 Sales Up, Earnings Down For Internatl. Min. & Chem., Lehigh Portland Cement

Net sales of the International Minerals & Chemical Corporation for the fiscal year ending June 30, 1956, were $96,626,799, which is a slight increase over the all-time high of $96,485,017 for the preceding fiscal year.

Net earnings after taxes were $5,401,723 or $2.14 per share of common stock, compared with $6,321,903, or $2.55 per share of common stock then outstanding for the previous year.

The Lehigh Portland Cement Company of Allentown, Penn., reports that 1956 consolidated sales, less freight and discounts, totaled $75,805,058, as compared with $70,894,796 for 1955. Earnings were $10,725,000, resulting in $2.82 per share in 1956, as compared with $11,262,000, or $2.96 per share in 1955.

Permanente Cement Sales Hit 17-Year High in 1956

Permanente Cement Company officials have announced that sales in 1956 were the highest in its 17-year history. Earnings for 1956 were the second-highest ever achieved, less than 1 percent below the 1955 record year. Sales of cement and gypsum products for the fiscal year ended January 31, 1957, totaled $43,553,000, compared to $43,082,000 in 1955.

Permanente Cement Company and its subsidiaries, including Kaiser Gypsum Company, had earnings (after federal taxes) in 1956 of $6,246,000 or $1.09 per share on the 5,705,000 shares outstanding. This compares with earnings in 1955 of $6,288,000 or $1.11 a share. The company's cement producing facilities operated at 100 percent of capacity throughout 1956.

Canada Cement Ltd. Reports Profit, Expansion in 1956

Net profits slightly exceeding $7,250,000 were reported by Canada Cement Ltd., for 1956. Despite increased sales in 1956, however, this figure represents a 4.4 percent decrease over the 1955 profit of $7,600,000.

Expansions at the company's plants include the recently-completed installation of a second kiln at its Woodstock, Ont., plant, bringing total capacity of the plant to 3,000,000 bbl. a year, and adding 1,500,000 bbl. to the company's total annual capacity.

At the Nello L. Teer Company operation near Durham, N. C., this 18-ton quarry truck, loaded with granite chunks, takes a steep slope easily. The carrier, an International Model 65 Payhauler, hauls granite a distance of 500 to 2,000 ft. from the quarry. At the plant the rock is crushed at the rate of about 237 t.p.h. It is used for road building, as concrete and asphalt aggregate, and in general construction. The firm is presently producing 75,000 tons of crushed stone for a disposal plant in Raleigh.

Lone Star Cement Co. Expansion at Nazareth, Pa. Nears Completion Stage

A modernization and expansion program started almost three years ago at the Nazareth, Pa., plant of Lone Star Cement Company is now nearing completion. When finished, the program will include replacement of three existing kilns with two larger ones, lengthening and modernizing of two additional kilns, and complete replacement of the cement dust recovery system.

When the two-stage program is completed, late this year, five original kilns will be replaced by four modern 11-ft. 3-in. by 300-ft. coal-fired, dry-process kilns, two of them entirely new.

The original mechanical-type dust collectors will be replaced by four new Research-Cottrell units, one for each kiln, consisting of gas conditioning towers and combination mechanical - electrostatic precipitators. Each of the precipitators will be designed to handle 120,000 c.f.m. of conditioned gas, with an overall efficiency of 98 percent.

Interest in Engineering Shows Encouraging Trend

More students are preparing for engineering careers this year than at any time since 1948. Figures compiled by the U. S. Office of Education (U. S. Department of Health, Education, and Welfare) and the American Society for Engineering Education, published by the Society, show a total of nearly 243,000 studying in accredited engineering colleges last fall.

This total is almost equal to the all-time high of 1947, when the colleges were jammed with World War II veterans. And today's trend is still upward.

Industry seeking more engineering graduates than it finds in college placement offices may take heart in this year's figures. The enrollment of senior (fourth-year) students in engineering last fall was up 20 percent over 1955, when graduates numbered nearly 24,000.

DUST *was a problem*

50 TONS of DUST discharged in 24 hrs.

"Headache" for producer of lightweight aggregate.

Dust Problem Licked!

OVER 90% free of effluent dust

Producer and community both happy!

"SEEING IS BELIEVING"—the above before-and-after views amply prove the efficiency of Southern's new wet type dust collector.

We had a "king size" problem in our own plant, making lightweight aggregates for the building trade. Extreme heat plus corrosive and abrasive action caused a 50,000 c.f.m. offensive effluent from six stacks. Naturally our neighbors complained!

We tried a lot of collectors, but all failed to stand up against the combination of heat, acids and corrosion.

Finally we designed and built our own—it has passed every test for effectiveness and durability in controlling atmospheric pollution.

If you have a similar problem, contact us for full information without obligation.

SOUTHERN LIGHTWEIGHT AGGREGATE CORPORATION
Process Engineering Division • Box 9138, Richmond 27, Va.

Higher Output of Cement Indicated in Final Report Of Mines Bureau for 1955

In 1955 the cement industry in the United States produced four classes of cements—portland, natural, slag, and hydraulic lime—and prepared masonry cements, as reported to the U. S. Bureau of Mines.

Production of portland cement was 9 percent greater in 1955 than in 1954, reaching 297,000,000 bbl.

Production of prepared masonry cement increased to 16,000,000 bbl. in 1955. This figure is not comparable to the 1954 figures because it includes masonry cements produced at natural and slag cement plants.

Production of natural, slag, and hydraulic lime cements remained nearly the same in 1955 as in 1954—nearly 1,000,000 bbl.

Shipments of portland cement rose to 293,000,000 bbl., valued at $837,000,000, with an average value of $2.86 per barrel. Portland cement used in making masonry cement (3,500,000 bbl.) was not included as shipments in 1955.

Shipments of prepared masonry cements increased to 16,000,000 bbl., valued at $56,000,000.

Shipments of natural, slag, and hydraulic lime cements were nearly 1,000,000 bbl., valued at $3,000,000, with an average value of $3.16 per barrel.

Comparative figures on apparent consumption can be shown only for portland cement. Based on the quantities of portland cement shipped by producers to destinations in the various states, consumption was higher in 37 states and the District of Columbia and lower in 11 states.

The estimated annual capacity of the portland cement plants on December 31, 1955, was 6 percent higher than at the end of 1954. The percentage of capacity utilized was greater in all districts except 5, where large increases in producing capacity were reported.

A breakdown of the total production of portland cement by various types indicates that 3 plants produced a true portland-pozzolan cement using pozzolanic materials; 7 plants used blast furnace slag to make portland-slag cement (A.S.T.M. definitions).

Natural cement was produced by three plants, slag cement (formerly referred to in these reports as pozzolan cement) by two plants, and hydraulic lime by one plant. Four of these six plants and another natural cement plant produced prepared masonry cement in 1955. Production and shipment of these prepared masonry cements were combined with the prepared masonry produced at portland cement plants for the first time in 1955.

Insulation Booklet Revised By Vermiculite Institute

Vermiculite Loose-Fill Building Insulation has been revised and reissued by the Vermiculite Institute. The booklet includes reference to a new federal specification HH-1-585, which covers vermiculite.

The requirement by F.H.A. and other federal agencies of a vapor barrier below fill insulations in attic spaces has been withdrawn in structures when vermiculite is used. When the space is properly ventilated, no vapor barrier is needed.

The booklet is available from the Vermiculite Institute, 208 S. LaSalle St., Chicago 4, Ill.

February Lime Sales Drop From Record of January

Domestic sales of open-market lime in January, 1957—amounting to 766,820 short tons—increased slightly over the previous month's output, according to reports of producers to the Bureau of Mines. Sales of building, refractory, chemical, and industrial uses increased, but agricultural lime decreased.

February sales showed a slight decrease from the January total, and reached only 725,955 short tons. Sales of agricultural and building lime increased but refractory, chemical, and industrial uses declined somewhat.

The accompanying table shows sales by types and major uses.

Industry Problems Studied, Officers, Directors Elected At Empire State Meeting

The Sixth Annual Convention of the Empire State Sand, Gravel and Ready Mix Association was held from May 13, 14, and 15 at the Sheraton Ten Eyck Hotel in Albany.

Paul H. Bird, senior engineer-geologist of the New York State Department of Public Works, discussed *Geology of Sand and Gravel Deposits in New York State* at the first session. (Members of the audience participated in this discussion.)

In the afternoon officers and directors were elected and committee reports were presented. The report on the association's legislative activities covered the work done by the joint committee at Allied Construction Industries. Bud Kirwin, director, presented a paper and led the discussion on the importance of proper evaluation of costs in operating a business.

Guest speaker at the annual banquet was William Moore, president of the J. P. O'Connell Company of Boston, Mass., a past president of the National Ready Mixed Concrete Association.

A discussion at the closing session covered the newly revised truck mixer standards, the proper use and maintenance of mixers, and the use of radio equipment.

Hercules Cement Corporation has boosted its annual capacity by about 10 percent to 3,300,000 bbl. with the replacement of a kiln at the company's main plant in Stockertown, Pa.

Lime Sold by Producers[1] in the United States, in Specified Periods of 1956-57, by Types and Major Uses, in Short Tons

	January	February		January-February	
	1957	1957	1956	1957	1956
Quicklime	640,567	587,285	612,684	1,227,852	1,240,816
By types:					
Hydrated lime	126,253	138,670	150,281	264,923	290,564
Total lime[2]	766,820	725,955	762,965	1,492,775	1,531,380
By uses.					
Agricultural:					
Quicklime	900	1,957	2,494	2,857	6,775
Hydrated lime	5,918	10,184	12,100	16,102	18,795
Total lime	6,818	12,141	14,594	18,959	25,570
Building:					
Quicklime	10,200	10,255	11,891	20,455	25,100
Hydrated lime	56,502	66,447	69,481	122,949	135,180
Total lime	66,702	76,702	81,372	143,404	160,280
Chemical and other Industrial:					
Quicklime	403,033	385,729	388,360	788,762	784,535
Hydrated lime	63,833	62,039	68,700	125,872	136,589
Total lime	466,866	447,768	457,060	914,634	921,124
Refractory (dead-burned dolomite)	226,434	189,344	209,939	415,778	424,406

[1]Also includes a small quantity of captive tonnage. The monthly canvass excludes the output of plant producing less than 10,000 tons a year.

[2]Approximately 60 percent of lime produced is high calcium and 40 percent high magnesium.

Yes! . . . it's ALL STEEL

HP RANGE:
½ to 40 hp

RATIOS:
4:1—14:1—24:1 (or 20:1)

OUTPUT SPEED RANGE:
420 to 5 rpm

TORQUE RATINGS:
up to 31,000 lb-in

FALK
ALL STEEL
Shaft Mounted Drive

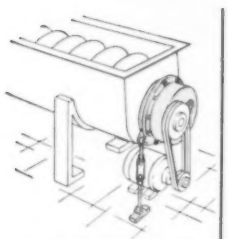
. . . Steel can "take it"!

STEEL frame . . . of fabricated plate supports all rotating elements—provides double the ability of iron to maintain vital alignment of revolving elements, even under shock load or external impact.

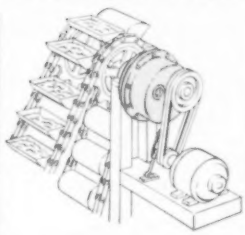
STEEL housing . . . will not fracture, serves only as protective cover and lubricant reservoir. Therefore, lubricant supply is safeguarded.

STEEL tie-rod and straddle-mounted tie rod brackets . . . are fastened to heavy steel frame by steel bolts in double shear.

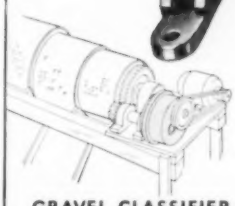
A FEW TYPICAL APPLICATIONS



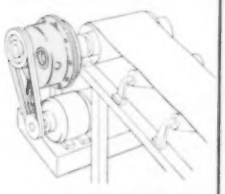
SCREW CONVEYOR



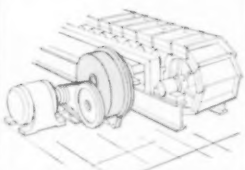
BUCKET ELEVATOR



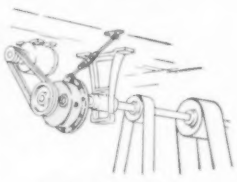
GRAVEL CLASSIFIER



BELT CONVEYOR



APRON FEEDER



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DELIVERIES TO MEET YOUR REQUIREMENTS

Off-the-shelf delivery from your Authorized Falk Distributor. *Shipment from factory or warehouse stocks* within 72 hours after receipt of your order.

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THE FALK CORPORATION, 3001 W. CANAL ST., MILWAUKEE 1, WIS.
Representatives and Distributors in Most Principal Cities
Manufacturers of Quality Gear Drives and Flexible Shaft Couplings

FALK
. . . a good name in industry

Former Limestone Mine Of Southwest Lime Co. Doubles as Warehouse

A worked-out limestone mine converted into a warehouse by the Southwest Lime Company of Neosho, Mo., has been found economical and radiation-proof.

Known as the Ozark Terminal, the concern contains six rooms, each approximately 55,000 sq. ft. in area and 20 ft. high. These rooms, formed by 8-in. reinforced concrete partitions with fireproof doors, have asphalt flooring and walls and ceilings painted white for maximum lighting. Large circular limestone pillars were left to support the mine roof and prevent cave-ins. A 60-degree temperature is maintained.

The warehouse is equipped with automatic humidity control and a sprinkler system and exhaust fans to combat smoke or gas in case of fire. A railroad spur leads into the hillside to underground docks, which can handle 15 freight cars at once.

WILLIAM E. MILLER, owner of the Central Oregon Pumice Company, Bend, Oreg., has been elected president of the Pumice Institute.

rely on the line of strongest design...Hercules

RB Series rock body

BUILT RUGGED FOR ROCK!

Made to order for rock work . . . that's Hercules' RB Series rock body line. With 1/4, 5/16 or 3/8 in. steel plate shells, electro-welded box-reinforced side construction, hardwood-cushioned wear plates and heavily reinforced top rolls, these bodies take the impact shocks of power shovel, chute and conveyor loading in stride! And, carefully engineered scow end and body side slope assure firm packing of loads in transit plus fast, clean dumping. AA-5065

Ask your Hercules distributor to show you how RB Series 15 to 25 cu. yd. rock bodies can cut your operating costs.

HERCULES STEEL PRODUCTS COMPANY
Galion, Ohio

Major Potash Concerns Of Canada, United States Work Saskatchewan Beds

With two companies—the Potash Corporation of America and the Continental Potash Corporation—in the shaft-sinking stage, and more than 19 other companies and individuals holding concessions throughout the length of the province-wide potash belt, it is expected that the long-awaited development of Saskatchewan's vast potash deposits is about to begin.

Continental Potash Corporation, formerly the Western Potash Corporation, was the first to start shaft sinking. At last report Continental had reached 1,170 ft.

The Potash Corporation is reported to have sunk its shaft 3,200 ft. Latest estimates indicate that development to the production stage, including a concentrator, may cost $20,000,000. It is expected that the firm will be in production next year.

Several other major concerns with holdings include the National Potash Company, U. S. Borax & Chemical Corporation, Duval Sulphur & Potash, Campana Ltd., General Petroleum of Canada, International Minerals & Chemical Corporation, International Potash, Ltd., Saxon Mining Company, Southwest Potash Corporation, Dominion Potash Ltd., Continental Geological Corporation, Gordon Daly Corporation, S.A.M. Exploration Ltd., and R. Campbell & Associates.

The Saskatchewan potash deposits are the only known commercial occurrence in Canada, and one of only two in North America. The other is at Carlsbad, N. M., where almost the entire production in this continent is presently mined.

Total reserves of the Saskatchewan deposits are estimated at 100,000,000,000 tons lying at varying depths beneath the prairie flatlands. They are larger than any previous potash find. Total North American reserves previously were estimated to be 55,000,000,000 tons, mostly at Carlsbad.

At the annual meeting of the Acme Limestone Company, Ft. Spring, W. Va., Frank Prince was named chairman of the board, J. A. Rigg was named president, and A. W. McThenia was elected vice-president and general manager. Other newly-elected officers are E. Ray Roush, secretary; W. H. Ruby, chief engineer and manager of traffic; and Charles F. Smith, manager of sales and traffic.

TELSMITH®

produces aggregate for the

ST. LAWRENCE SEAWAY

Telsmith 16-B Gyratory Crusher

▲ PRIMARY CRUSHING—**Two Telsmith Roller Bearing Jaw Crushers** with **two Telsmith Heavy Duty Apron Feeders**—a 42 x 48 crusher with a 48" wide feeder; and a 30 x 42 crusher with a 42" wide feeder.

Three Telsmith 5' x 12' Double Deck Vibro-King Sizing Screens ▼

• In Helena, New York, near Massena, this Lambert-Mills-Gorman plant is supplying aggregate for the Robinson Bay and Grass River Locks. Plant produces about 8,000 to 10,000 tons per day, of four sizes: minus 6" plus 3", minus 3" plus 1½", minus 1½" plus ¾", minus ¾" plus 4 mesh and manufactured sand. Primary crushing is efficiently handled by Telsmith 42 x 48 and 30 x 42 Jaw Crushers. Their product is scalped—plus 6" going to a 16-B Telsmith Gyratory Crusher; and minus 3" to a surge pile, then to three Telsmith double deck Vibro-King Screens.

Send for Equipment Bulletin 266

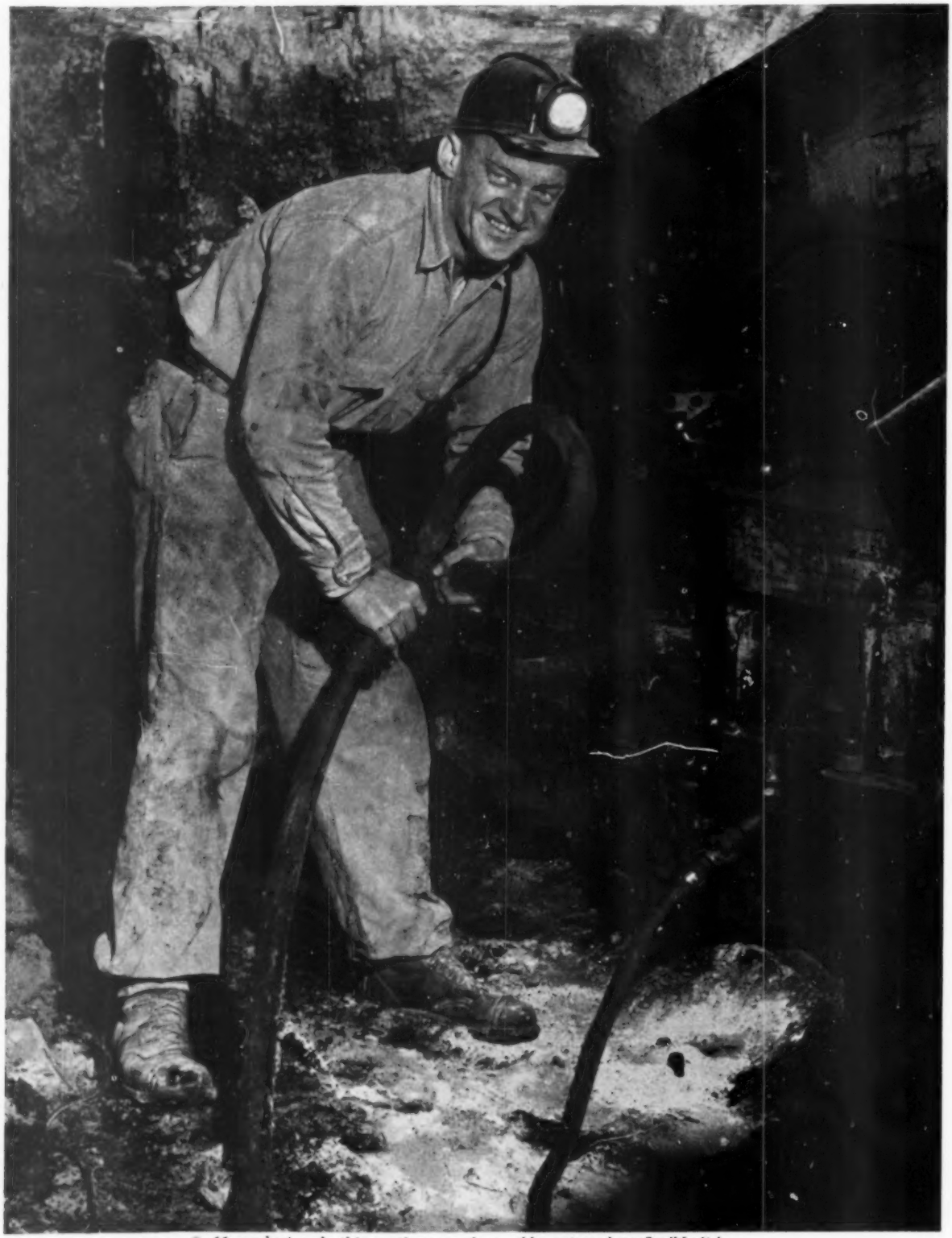
Q-35

SMITH ENGINEERING WORKS

504 E. CAPITOL DRIVE **MILWAUKEE 1, WISCONSIN**

Representatives in Principal Cities in All Parts of the World • Cable Address: Sengworks, Milwaukee

If you watch cable costs



11 conductors in this continuous miner cable, yet see how flexible it is.

you'll like Tiger Brand

It's always a thrill to walk into a tough, cost-conscious mine and find that they are using huge quantities of Tiger Brand Amerclad mining cable. It vindicates our attitude that mining cable *must* be built to the very highest standards.

Our flat "Bridgewall" cable is an example. Tiger Brand flat twin mining cable in sizes #1 and smaller actually has a thick wall of neoprene between the insulated conductors. It locks the conductors and ground wire (if specified) in a tight embrace and holds them there—even when the cable is badly bent or twisted. No other type of construction is so durable.

Naturally, flame-resistant jackets are used throughout. And all of these very-heavy-duty cables are vulcanized in a lead mold under pressure, to insure a dense, tough jacket. *Money cannot buy a better cable!*

AMERICAN STEEL & WIRE DIVISION, UNITED STATES STEEL
GENERAL OFFICES: CLEVELAND, OHIO

COLUMBIA-GENEVA STEEL DIVISION, SAN FRANCISCO, PACIFIC COAST DISTRIBUTORS
TENNESSEE COAL & IRON DIVISION, FAIRFIELD, ALA., SOUTHERN DISTRIBUTORS
UNITED STATES STEEL EXPORT COMPANY, NEW YORK

● This special cable was made for continuous miner. It contains power, grounding, lighting and communication conductors.

● Rubber-tired buggy fed with "Bridgewall" Tiger Brand. Cable is under *continuous strain.*

USS TIGER BRAND ELECTRICAL WIRE & CABLE

A STANDARD TIGER BRAND CABLE FOR EVERY SPECIAL JOB

- asbestos wire and cable
- mold cured portable cord
- shovel & dredge cable
- paper & lead cable
- varnished cambric cable
- interlocked armor cable
- special purpose wire & cable
- aerial, underground and submarine cable

UNITED STATES STEEL

Quick connection for better blasting...

AUSTIN DETONATING FUSE and CONNECTORS

Effective blasting depends upon use of a powerful detonating fuse with proper connection between trunk and lead lines.

That explains why successful strip mines and quarries rely on Austin Detonating Fuse and plastic Connectors. This combination provides a quick hook-up of high strength fuse that won't slip, slide or lose contact in any weather or under any job condition. It also eliminates tying of knots and the resultant possibility of their becoming untied.

Blasting goes according to schedule with Austin Detonating Fuse, for it possesses more than enough power to initiate the entire charge in every hole. Protected with a waterproof covering, it is tough, but flexible . . . won't chip, peel or crack while being laid. It's insensitive to shock, abrasion and stray electrical currents.

AA-4482

First, thread fuse from shot hole through length of connector. Then, press the trunk line into the grooved slots.

Next, return the branch line through the end of the connector on the other side of the trunk line. Pull both ends of branch line tight for positive connection.

USED IN 1833 AUSTIN EVER SINCE

AUSTIN
POWDER COMPANY
CLEVELAND 13, OHIO

explosives ◆ permissible dynamites ◆ mine tools
◆ detonating fuse ◆ AP drill heads ◆ Akremite ◆ primers

● Frank Foit, American Institute of Architects, of the firm of Foit and Baschnagel; Dr. George E. Ziegler, research director of Zonolite Company; and Robert Rauh, Zonolite representative and vice-president of the Buffalo Chapter of The Producers' Council, Inc. Dr. Ziegler addressed more than 100 architects at a meeting in Buffalo, N. Y., on lightweight vermiculite construction.

R. H. Tucker, I. R. Hansen Promoted to New 3M Posts

Election of Robert H. Tucker as secretary and Irwin R. Hansen as treasurer of the Minnesota Mining & Manufacturing Company, St. Paul, Minn., was announced recently.

Mr. Tucker, formerly assistant secretary, succeeds John L. Connolly, who has reached retirement age. Mr. Connolly, who is also general counsel for 3M, will continue in that capacity and will also continue as a director.

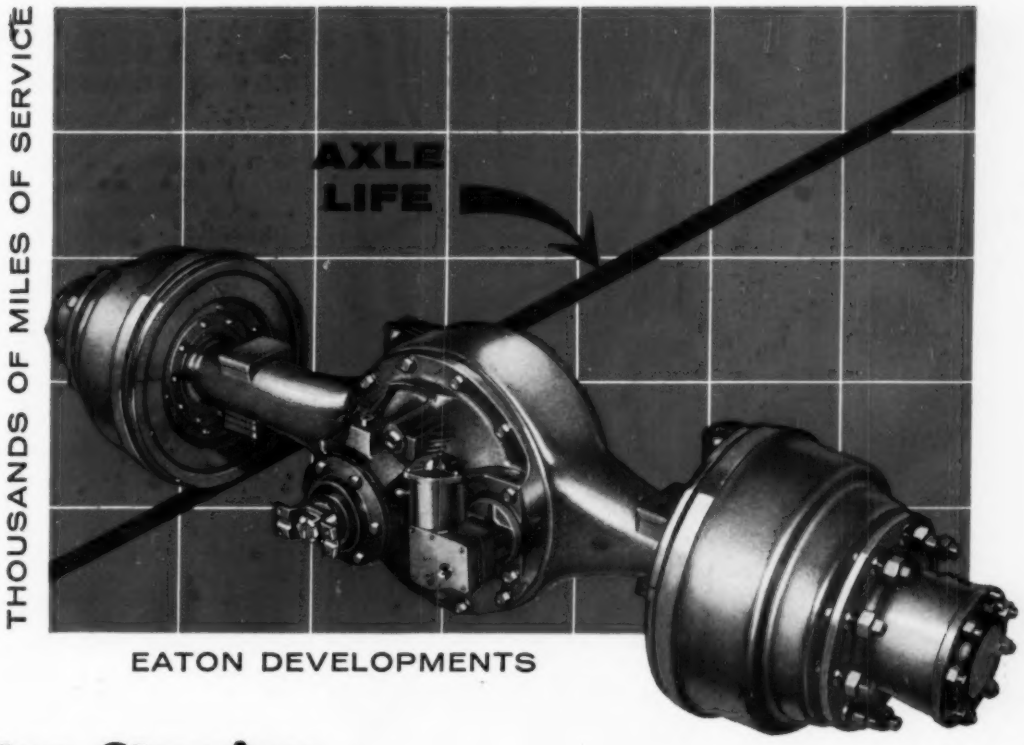
Mr. Hansen, assistant treasurer of the firm since 1954, succeeds Clarence M. King, who has retired but serves in an advisory capacity.

Kelvin T. Bacon has been elected assistant treasurer, replacing Mr. Hansen. Thomas J. Lyons succeeds Mr. Tucker as assistant secretary.

Federal-Aid Highway Bids On Road Construction Rising

Bid prices for Federal-Aid Highway construction in the first quarter of 1957 were 1.4 percent higher than in the preceding quarter, according to Bertram D. Tallamy, federal highway administrator, U. S. Department of Commerce. The figure is based on contracts for Federal-Aid Highway construction awarded by state highway departments and reported to the Bureau of Public Roads.

With 1946 as a base year, the price index rose from a low point of 125.5 in the second quarter of 1955 to 142.6 in the first quarter of 1957, an average increase of 1.8 percent per quarter or 7.5 percent per year.



Extra Stamina
Makes EATON 2-Speed Axles BEST for Modern High-Powered Trucks

Through continuous advancement in design and metallurgy, Eaton 2-Speed Axles provide the greater stamina needed to meet the demands of modern motor truck transportation. They supply the perfect combination of ruggedness and light weight, which means that Eaton Axle trucks haul maximum payloads, at lowest cost per ton—and lowest cost per mile.

By furnishing the right gear ratio for every operating condition, Eaton 2-Speeds reduce stress and wear on engines and all power transmitting parts; they keep trucks on the job, out of the repair shop. Operating and maintenance costs are held down to rock bottom; trucks last thousands of miles longer, and are worth more when traded-in.

More than Two Million Eaton Axles in Trucks Today. For complete information, see your truck dealer.

EATON — *AXLE DIVISION*
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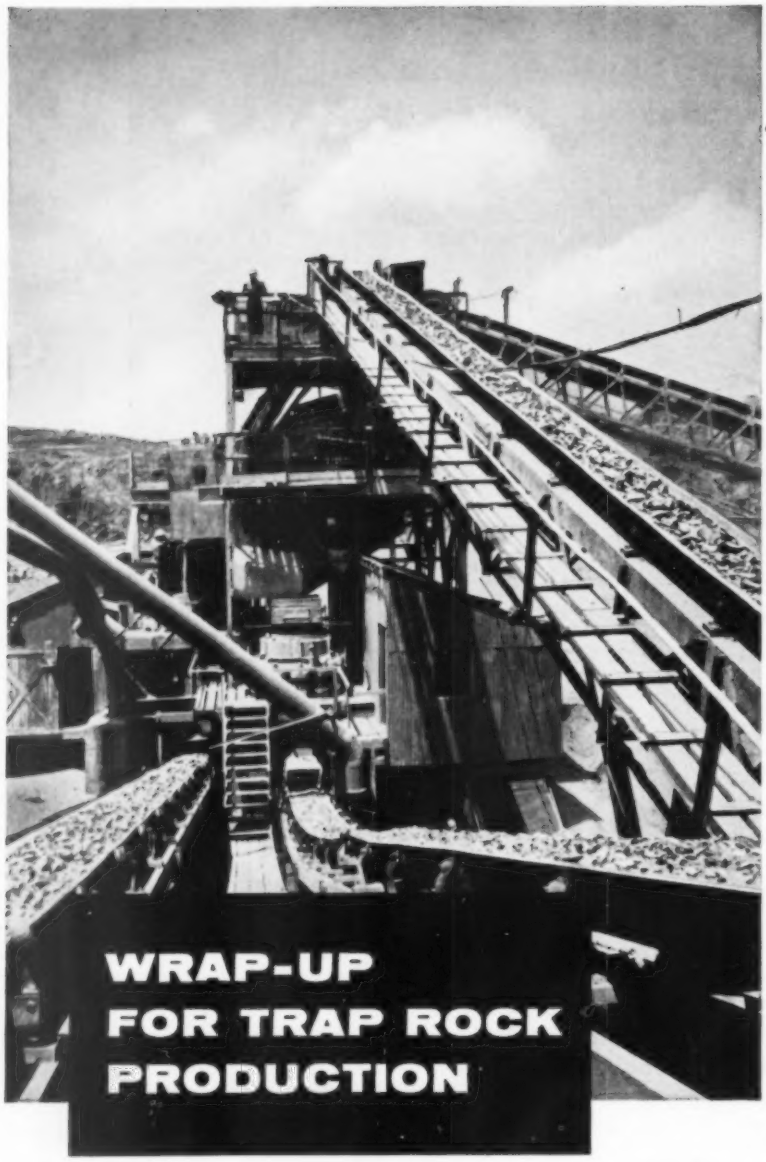
CLEVELAND, OHIO

PRODUCTS: Engine Valves • Tappets • Hydraulic Valve Lifters • Valve Seat Inserts • Jet Engine Parts • Hydraulic Pumps Motor Truck Axles • Permanent Mold Gray Iron Castings • Forgings • Heater-Defroster Units • Automotive Air Conditioning Fastening Devices • Cold Drawn Steel • Stampings • Gears • Leaf and Coil Springs • Dynamatic Drives, Brakes, Dynamometers



At the Kingston Trap Rock Co., this H-R conveyor system has been in operation for over seven years . . . and it's still maintaining peak production at minimum maintenance. Fourteen conveyors, from 175' to 325' long, and from 24" to 42" in width, carry 700 tons of trap rock per hour from primary crushers to surge pile, then to secondary crushers, to screens, and finally to storage.

Here, as in hundreds of other applications, Hewitt-Robins engineered, manufactured, and installed the complete bulk materials handling system. To find out how H-R products and services can help you, consult your classified telephone directory for the nearest H-R representative, or contact Hewitt-Robins, Stamford, Connecticut.

HR HEWITT-ROBINS

CONVEYOR BELTING AND IDLERS . . . POWER TRANSMISSION DRIVES
INDUSTRIAL HOSE . . . VIBRATING CONVEYORS, SCREENS & SHAKEOUTS

Asbestos Corp., Canada Starts $5,000,000 Project At King, Beaver Mines

The Asbestos Corporation, Montreal, Quebec, has begun enlarging its Beaver mill in a $5,000,000 project to process Beaver and King mine ore through one mill instead of the present two.

The Beaver mine and mill has been closed in order to install additional equipment, and during the shut-down period orders of Beaver fiber will be filled from inventory, and operations of the King mill will be increased by 20 percent.

At the completion of the project in mid-1958, the Beaver mine will have the capacity equivalent to the combined output of the two mills. The King mine will be closed permanently with the reopening of the Beaver plant.

Company officials have studied this program for some time in order to improve operating efficiency and increase earnings. The consolidation will free a substantial amount of underground ore now frozen by the King mill, and it is expected to result in appreciable operating economies.

New York Coal Company Changes Name to Davon, Inc.

New York Coal Company, Columbus, Ohio, has changed its name to Davon, Inc., according to an announcement from Edwin H. Davis, chairman of the board. New York Coal Company owns and operates nine plants throughout Ohio for the production of sand and gravel, crushed stone, agricultural limestone, ready-mixed concrete, and concrete products.

Since the firm sold its coal interests in 1954, and has been producing other natural resources for many years, the former name was considered misleading.

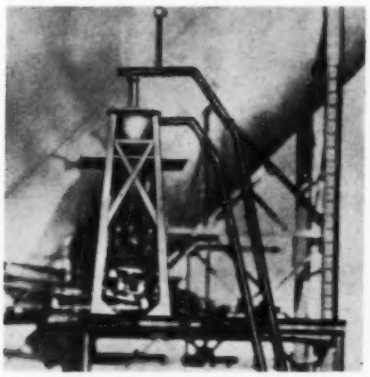
Georgia Aggregate Concern Ups Production at Rockmart

The Georgia Lightweight Aggregate Company of Atlanta, Ga., producers of Galite expanded shale aggregate, has increased production at its Rockmart, Ga., plant with the addition of new facilities.

Equipment includes conveying systems, raw storage silo facilities, one 8- by 125-ft. rotary kiln, and one 6- by 70-ft. rotary cooler. Foundations and footings were provided during this expansion program in preparation for future installation identical to that just completed.

King-Size Wet Cyclone Does Entire Processing Job on Silica Sand

Dick Arthur, silica-sand producer at Selkirk, Man., Canada, placed one of the simplest, yet most efficient, processing operations in service last year. Finished industrial and glass sands in the minus 10-mesh



The wet-cyclone de-watering and cleaning unit, and the surge tank at the Arthur silica sand plant near Selkirk, Man.

range were stockpiled or loaded directly into gondola cars for shipment at an average rate of 150 t.p.h. and at a processing cost of less than 10 cents per ton. This figure not only included all labor, operating, and maintenance expenses, but amortization of the entire installation on a 5-year basis.

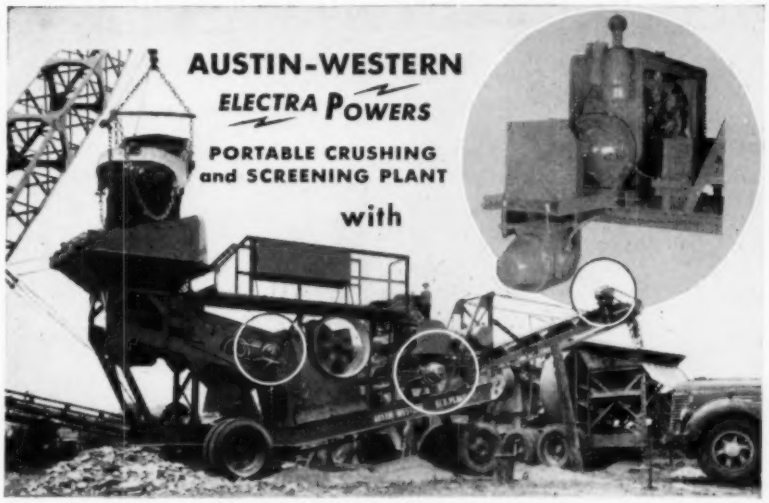
Engineered by Huggard Equipment Co., Ltd., of Winnipeg and Port Arthur, the equipment involved little more than one of the largest (45-in. dia.) Duraclone rubber-lined wet-cyclones ever installed. No drags, screw classifiers, screens, or other equipment usually employed in sand preparation were used.

Sand is dredged at Black Island on Lake Winnipeg and transported by barge for a distance of 90 miles to the shore-side Duraclone plant at Selkirk. As received at the Selkirk dock, the raw sand has an average moisture content of 10.5 percent. Additional water is added, however, to create a pumpable slurry—about one-third water—in the holds of the barges. An Ellicott 10-in dredge pump delivers this slurry by pipeline under pressure to the 8-in. inlet of the wet cyclone.

Any deleterious materials, including alumina and undesired fine iron oxides, are carried away to waste in the Duraclone overflow, along with the spent water. The centrifugal action pulls the clean sand out in the underflow, where it is spouted directly into the gondola cars, or stockpiled by belt-conveyor.

Moisture content of the finished sand averaged about 16 percent last year, but according to R. C. Huggard, changes in the set-up as the second operating season got under way late this spring were expected to result in de-watering to about 10 percent. Among the changes planned was the elevation of the Duraclone to a point above a 200-ton surge tank. Mounted in a diagonal position, with the discharge spout at the bottom of the tank, it is anticipated that the tank's settling action will yield a drier discharge product.

An agreement for the construction of a cement factory in western Nigeria costing between £2,500,000 and £4,500,000 was scheduled to be signed soon in London, England, by the Associated Portland Cement Manufacturers, Ltd., the United Africa Company, and the Western Region Production Development Board. The plant is expected to produce 100,000 tons a year.



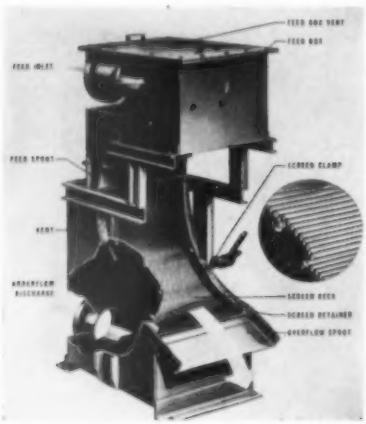
WINPOWER GENERATORS

Baldwin-Lima-Hamilton Corp.,—Construction Equipment Division—Lima, Ohio, manufacturers of AUSTIN-WESTERN crushing and screening equipment shown here, use WINPOWER generators for electric power. They know that by using WINPOWER powered electric motors and speed reducer drives on conveyors, feeders and screens they can eliminate long drive belts and drive shafts, expensive to buy and difficult to replace in case of failure in the field. *Whatever* your need there is a WINPOWER Generator for you. Generators as well as gasoline or diesel powered electric plants in capacities from 400 watts to 100 KW. You can save time and money with WINPOWER. See your WINPOWER Distributor or phone, write or wire at once for complete illustrated folder and specifications.

WINPOWER MFG. CO.
NEWTON, IOWA • U.S.A.

New Machinery
and Equipment

For Further Information Use Card on Pages 207-208



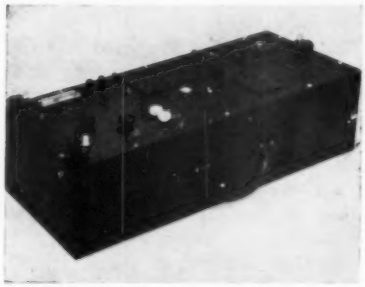
• Dorr-Oliver Incorporated has made available the DSM screen for the continuous wet screening of slurries containing non-fibrous solids. This new stationary screen is particularly adaptable to separations in the 8 to 48 mesh range.

The new unit is basically a concave, horizontal-wedge-bar type of screen secured in a stationary housing. An integral part of the housing is a feed box equipped with both an inlet port and feed spout. The feed spout distributes incoming slurry across the full width of the screen. Undersize material which passes through the screen is collected in the lower part of the housing and discharged through another port. The oversize product flows across a lip at the base of the screen. **(51)**

• Ingersoll-Rand has introduced a new self-propelled blast hole drill, known as the "Crawl-IR." The unit is mounted on crawler tracks driven by air motors which are reversible and independently controlled for steering in any direction. A knee-action frame allows the drill to move over any type of terrain.

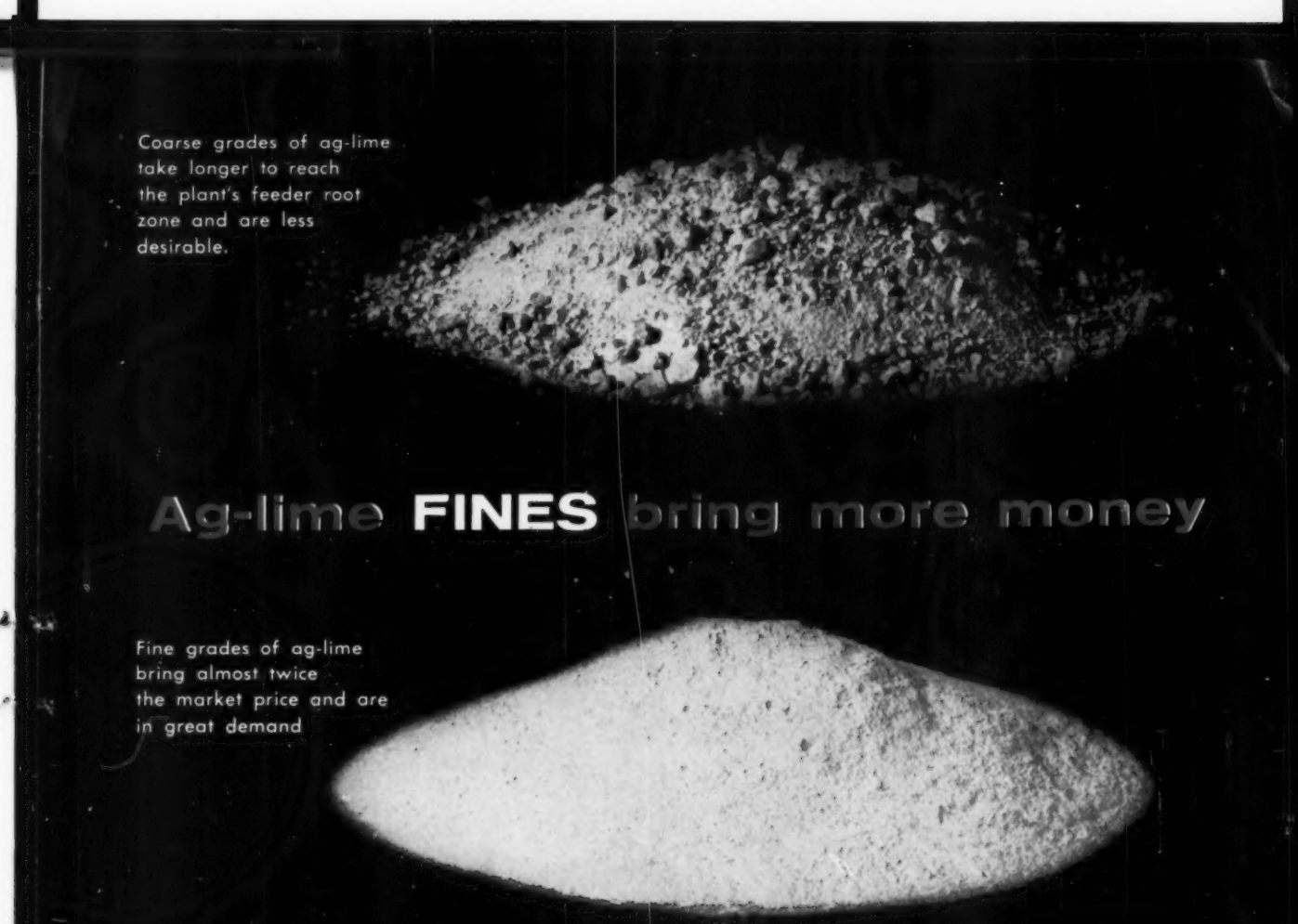
Drill positioning is completely mechanized through five hydraulic cylinders. Two hydraulic cylinders operate the boom, allowing it to swing in a horizontal arc of 85 deg. and a vertical arc of 82 deg. Horizontal boom swing allows a maximum hole spacing of nearly 10 ft. Horizontal holes can be drilled from ground level to 7 ft. without moving the unit on its tracks. Three additional cylinders position the feed-tower for vertical, horizontal, or angle drilling from any boom position. **(52)**

• Designated the "Sweptside 100," the 1957 Dodge pick-up truck has a 116-in. wheelbase and is available with 204-hp. V-8 or 120-hp. 6-cylinder engine, push-button driving controls with automatic transmission, power brakes, and power steering. The "Sweptside 100" is useful for transporting personnel and delivering repair parts to the field. **(53)**



• A portable blast and vibration seismograph offered by the W. F. Sprengnether Instrument Company, Inc., has been developed for the recording of vibrations generated by blasting and by industrial operations. The entire seismograph is self-contained in a rigid aluminum case measuring 25 by 10 by 8 in. The unit weighs only 38 lb., and requires no external connections of any kind.

The instrument can be set up, levelled, and made ready to operate in a few minutes at any reasonably level location. The necessary controls for adjusting and operating the unit are all easily available and plainly marked on the top panel. **(54)**


Coarse grades of ag-lime take longer to reach the plant's feeder root zone and are less desirable.
Ag-lime FINES bring more money
Fine grades of ag-lime bring almost twice the market price and are in great demand

(Eagle's portable cage mill at work on property of John W. Karch Stone Company, Celina, Ohio.) The purchase and installation of this plant resulted from a Karch sample being processed into an improved product through an Eagle Cage Mill. Completely satisfied with the results, this machine is now producing approximately 25 tons per hour—easily meeting all state specifications.

You can pick up the steady big premiums on finer ag-lime. Today's scientific farming demands this grade of ag-lime, which, because it is absorbed faster, can recover the investment faster with cash crops.

EAGLE CAGE MILLS produce more fines!

A single pass Eagle four-row cage mill with its high-speed impact, disintegrating action using hard-faced bars, not only produces a finer aggregate—it increases the tonnage as well! The single pass design has been producing this superior quality ag-lime at an average rate of 30 tons per hour, subject to variations in raw material and weather conditions.

EAGLE

JAW CRUSHERS · IMPACT BREAKERS
PULVERIZERS · CONVEYORS · LOADERS

CRUSHER CO., Inc. GALION OHIO·U·S·A

Special offer ... Send us a sample (200# to 500#) of your present ag-stone, *freight collect*, for Eagle's gradation improvement test. We will put it through an Eagle Cage Mill, make a product report, and ship the resulting ag-lime back to you for your inspection. You're welcome to be on hand when the batch is processed, if you can make it. No obligations of any kind. We are convinced an Eagle mill can make more money for you and want to prove it to your satisfaction!

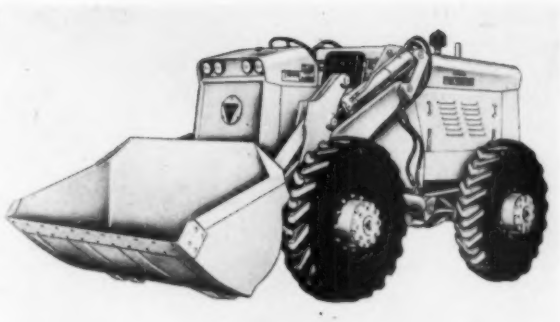
• Snap-Trac, a patented traction device, is now available from Snap-Trac, Inc., in truck tire sizes for off-the-road vehicles. Consisting of high-tensile steel scoop sections tightly chained together with case-hardened links, Snap-Tracs are said to double traction in off-the-road work.

Under heavy load in soft soil, the scoop sections dig in and open wide. As they leave the ground, the sections snap back against the tire, cleaning themselves. Designed primarily for off-the-road use, Snap-Tracs may be run on the highway at speeds up to 20 m.p.h. **(55)**

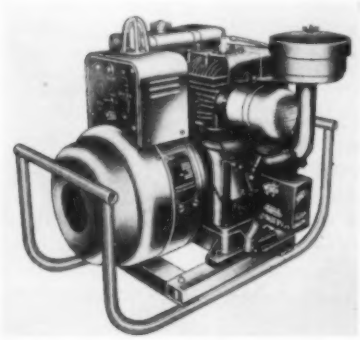
• To eliminate waste and dirt in the application of lubricants to expensive machinery, the Hulbert Oil & Grease Company has developed a grease cartridge which can be easily inserted and ejected from a grease gun.

The cartridges are filled with Hulbert 8 AP "Red Grease," a non-melting, water-resistant grease which incorporates Du Pont's new thickening agent, Esteril GT. The Hulburt Load-A-Matic gun is a precision-made gun which will take a Hulburt cartridge or can be filled by hand. **(56)**

• Model TL-20D Tracto-Loader, a completely new four-wheel-drive, 2-cu. yd. capacity front end loader introduced by the Tractomotive Corporation, features one-lever power shift and direction control, power steering, four-wheel power brakes, and a fully-enclosed hydraulic system. The 2-cu. yd. bucket can be independently tipped back 40 deg. at ground level. Maximum dumping clearance under the hinge pin is 11 ft. 7 in. Under the bucket cutting edge the dumping clearance is 9 ft. **(57)**



• Renner Manufacturing Company has introduced a new ¾ cu. yd. cast weld trench hoe dipper for 30-in. wide trenching operations. The dipper features a new lip design and a one-piece heat-treated alloy bottom casting which increases life and wearability. The sloping-back construction is said to eliminate heeling and assure maximum dumping speed. **(58)**



• The Wincharger Corporation has developed the new AUTOMATIC CONSERV-er idling control for its portable electric-generating plants. The idling control allows the generating plant to idle until a load of 75 watts or more is applied, providing a saving in fuel consumption and engine maintenance.

The new idling control is available as an accessory on the Winco 2,500- and 3,500-watt models. Both of these units are direct-connected and use Briggs & Stratton engines. **(59)**

• Models in the HMT series of single telescopic hoists offered by The Heil Company feature lighter weight and greater lifting capacity for dumping. The weight reduction is due to the use of special alloy steels, manganese bronze sleeve bearings, and higher designed hydraulic pressure system.

As an additional feature, these hoists incorporate the new SAE "O" rings plus 37 deg. flare SAE fittings in hydraulic pressure lines. These fittings provide tighter drip-proof connection without the use of pipe dope, long wrench extensions, and brute force. **(60)**

WATCH FOR FIRESTONE WHEN BIG JOBS BEGIN TO MOVE!

Firestone Rock Grips lead all tire choices with tread designs that travel any terrain!

Firestone Tubeless Rock Grips are making big news wherever heavy equipment rolls. Two great tread designs match toughness with traction to move your heavyweights over any course. Rock Grip construction eliminates your need to change tires to match terrain. It delivers the full flotation you need for sand and soft stuff. It also has the armored grip necessary to negotiate rock-hard runs over broken shale. Safety-Tensioned *Gum-Dipped*® nylon bodies and cut-resistant treads make these Firestones first choice tires with men who move equipment. Your Firestone Sales Engineer can demonstrate why you'll make them your first choice, too. Contact him today—through your local Firestone Dealer or Store.

ROCK GRIP WIDE BASE ROCK GRIP

Firestone

BETTER RUBBER FROM START TO FINISH

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LUBRICANTS ESPECIALLY GOOD FOR HEAVY LOADS

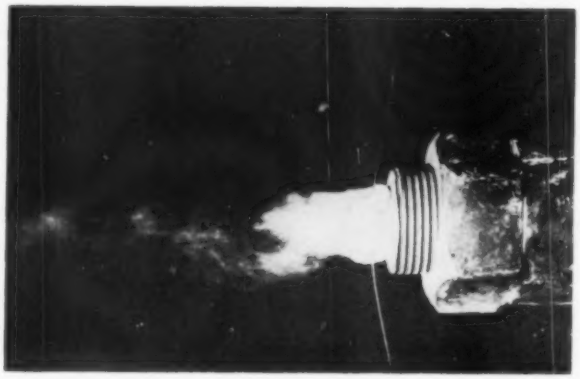
LUBRIPLATE
Nos. 130-AA, 630-AA and 930-AA
are grease type lubricants especially formulated for use in bearings and on other machine parts subject to heavy loads. Have extremely high film strength, marked adhesiveness and water repellence.

LUBRIPLATE
Nos. 4 and 8
are most satisfactory fluid type lubricants over a wide range of temperatures. Due to their high film strength, they are ideal for use where heavy loads are encountered.

REGARDLESS OF THE SIZE AND TYPE OF YOUR MACHINERY, LUBRIPLATE LUBRICANTS WILL IMPROVE ITS OPERATION AND REDUCE MAINTENANCE

For nearest LUBRIPLATE distributor see Classified Telephone Directory. Write for free "LUBRIPLATE DATA BOOK"... a valuable treatise on lubrication. LUBRIPLATE DIVISION, Fiske Brothers Refining Company, Newark 5, N. J. or Toledo 5, Ohio.

Workers prepare to shoot out clinkers from a choked-up kiln using the redesigned Ringblaster kiln gun manufactured by the Winchester-Western Div., Olin Mathieson Chemical Corporation.

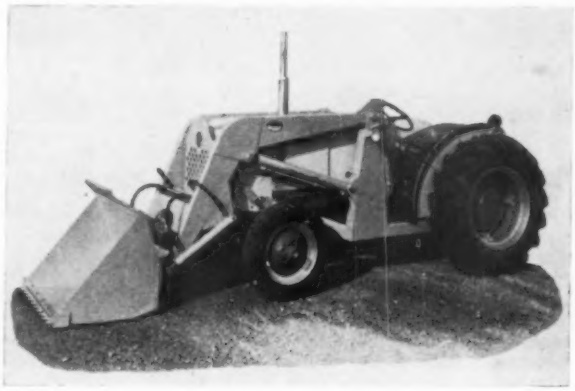


Actual firing of Western Super-X 8-gauge shell photographed at 3/1,000,000 of a second. Slug has fully emerged, has just broken trip wire, and is still passing between the broken ends.

• A completely redesigned kiln gun, designated the Ringblaster, has been developed by the Winchester-Western Division of the Olin Mathieson Chemical Corporation for shooting clinker rings from rotary kilns.

New design features include "Martini Action," which provides speed of operation; a special handle which speeds the firing cycle; a muffler which reduces the firing noise; and a protective mount which encloses all of the recoiling parts of the gun.

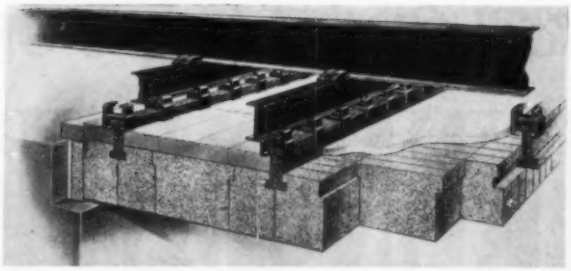
Using Western Super-X 8-gauge industrial shells, the Ringblaster is capable of developing a muzzle energy in excess of 7,500 foot pounds. **(61)**



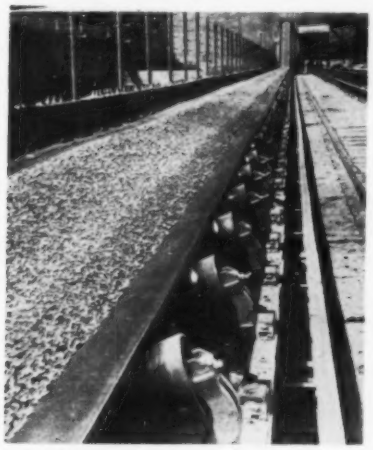
• A "Fifth Cylinder" automatic hydraulic bucket leveling device is a new feature on the "Chief" hydraulic loaders manufactured by The Henderson Manufacturing Company, Inc. Mounted on the left frame support, the "Fifth Cylinder" allows the operator complete freedom for tractor operation.

The 12 g.p.m. hydraulic system is said to lift 1,750 lb. to full height in 6 seconds and down in 3 seconds.

Models are now available to fit these utility tractors: Case 300 and 310; Oliver 55 and Super 55; IHC 300 and 350; Minneapolis-Moline 335 and 445; Ford 640 and 860; Ferguson 40; Massey-Harris 50; and others. **(62)**



• Type ALR, a suspended insulating refractory arch, is a recent development of the M. H. Detrick Company. The use of a dense refractory hanger in this new design results in an arch that can be applied without considering the temperature limits of a metal hanger. Because of its low heat storage, the arch is applicable to any unit that requires rapid heating and cooling, such as heat-treating furnaces and others which are operated on a periodic cycle. With relatively small component parts, the arch is easy to install. **(63)**

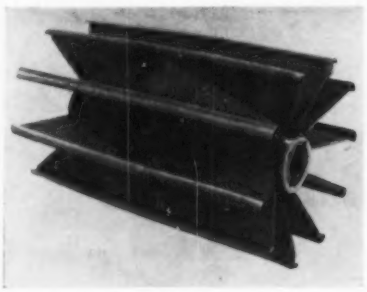


• Stephens-Adamson Style 444 belt conveyor carrier is designed to tip back for inspection or removal while the belt is running. A malleable iron and steel construction insures long service. Self-aligning bearings are tightly sealed to prevent escape of lubricant or entry of foreign material. **(64)**

• A new heavy-duty Rigger-Slusher block is now available from Sauerman Bros., Inc. This new addition to its line of Durolite blocks is reported to have the ability to withstand 14-ton dead loads without damage. Wide flange permits the use of up to and including ¾ in. wire rope.

Lightweight and tough, the block has wide applications for rigging work and in the mining field. A cast bead on the housing keeps rope in groove, even when block is working in a horizontal position. Quick opening design permits easy handling in cramped quarters. Roller bearings are sealed against dust and dirt and the large grease chambers require infrequent lubrication.

The Rigger-Slusher Durolite weighs 44 lb., and is available with roller or bronze bearings. Sheave diameter is 10 in. Overall length is 23 in. with swivel hook, and 19 in. with stiff shackle. **(65)**



• Belt Saver conveyor pulleys manufactured by the Van Gorp Welding Company are available in sizes ranging from 6 in. to 60 in. in diameter, and in face widths ranging from 7 in. to 66 in. Cone design of the self-cleaning pulleys discharges foreign material. Wing construction prevents building of ice or moist materials on belts.

Taperlock hubs and bushings allow for easy installation. The long radius of outside bars prevents excessive wear, provides longer belt life. **(66)**

VIBRATING TABLES

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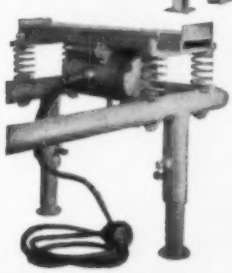

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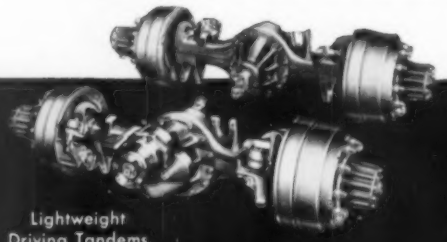
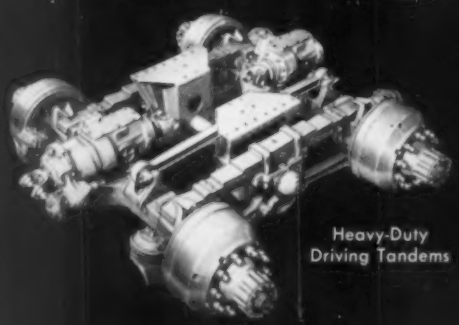
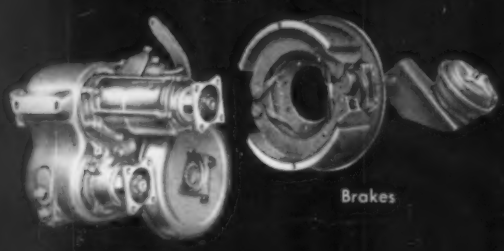


Lightweight Driving Tandems

Trailer Axles



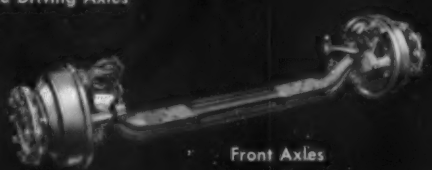
Heavy-Duty Driving Tandems



Brakes

Gear Boxes

Single Driving Axles



Front Axles

Whether your requirements call for highway or off-the-road equipment—Timken-Detroit offers torture-tested axles and brakes proven by almost 50 years of field testing and laboratory research!

Timken-Detroit meets all your requirements for driving, trailer and front axles . . . brakes and gear boxes . . . with a complete range of capacities in each product category. Shown here are some of the units included in the complete line.

Nearly 50 years of manufacturing experience—plus continuing field and laboratory research—have taughf Timken-Detroit the exacting needs of the trucking industry. Timken-Detroit Axles and Brakes are designed and built to give you the utmost in service, safety and dependability.

To you—this leadership in power transmission and braking systems means more productive road time, reduced operating costs and lower maintenance expense. Timken-Detroit Axles and Brakes are engineered to carry more payload . . . and stop more payload . . . at lower operating costs under all conditions.

The Timken-Detroit line of Medium and Heavy Duty Double-Reduction Tandems is an example of the superior engineering features and quality built into every Timken-Detroit product.

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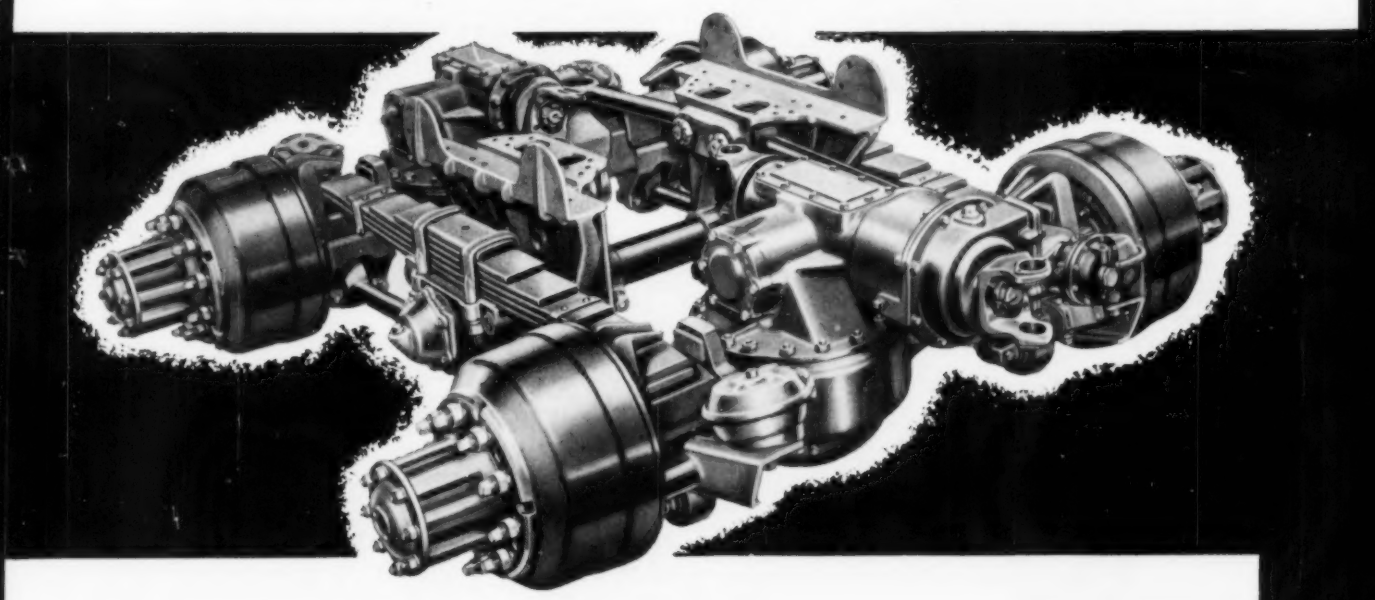

Timken-Detroit Heavy-Duty Double-Reduction Tandems Give You Payload Leadership!

Ability to take the toughest going and still deliver the load on time has helped make these rugged tandems the number one choice with operators of heavy-duty vehicles. These tandems give you the big advantages of long trouble-free service, economical performance and utmost dependability.

Here are a few of the features developed in famous Timken-Detroit Tandem Drive Units—

"Cradle Ride" Suspension... free ends of long, resilient springs float in axle spring guide brackets. This permits axles to articulate freely, adjusting themselves to road irregularities. Floating springs cradle the vehicle, materially reducing road shock and eliminating source of vehicle flutter. "Cradle Ride" suspension stabilizes the load, permits easy, restful driving . . . improves driver control and safety. Driving and braking forces are transmitted only through torque rods.

Hypoid Gears with their larger pinions and greater tooth contact give you outstanding performance, top efficiency and long life—plus lower maintenance costs.

Inter-Axle Differential divides torque evenly between axles . . . yet permits wheels of one axle to turn faster or slower than wheels of the other axle. This means both axles are always doing equal amounts of work. Driving parts and tires last longer. Controlled from the cab, differential can be locked out at any speed to give positive through drive.

Rectangular Shaped Axle Housings are forged from high carbon steel. This rectangular shape, combined with full strength corner sections, provides the greatest strength possible with minimum weight and size.

Famous Torsion Flow Axle Shafts are made even stronger through the use of more splines and greater root and body diameter.

Dependable Heavy Duty "P" Series Air Brakes with unit-mounted design make a compact self-contained assembly. Temperatures are lower and liner life is longer because of open type spiders. Tapered "Econo-liners" provide greatest thickness in area of greatest wear.

Unequaled parts interchangeability gives you more time on the road—reduces parts inventory—speeds service. Parts are standard items readily available.

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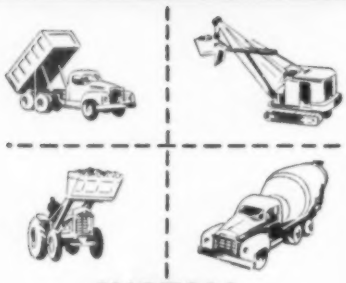

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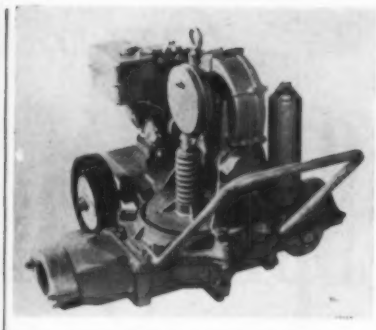
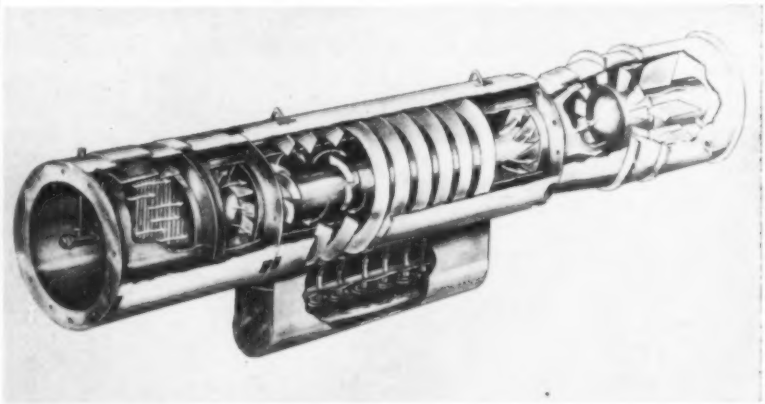


• Rice Pump & Machine Company has introduced a new line of compact, lightweight diaphragm pumps which feature one-step gear reduction. Design of the pumps enables the use of a clutch between the pump and the engine. Pumps are available with suction accumulators and swing type valves as shown or with ball check. (67)

• The Ryd-in automatic coupler for industrial equipment, available from the Rydin Railway Equipment Company, reduces slack, stabilizes moving cars, and permits higher speeds. The coupler features a wide gathering range, horizontally and vertically, and, according to the manufacturer, will not jack-knife or become uncoupled accidentally.

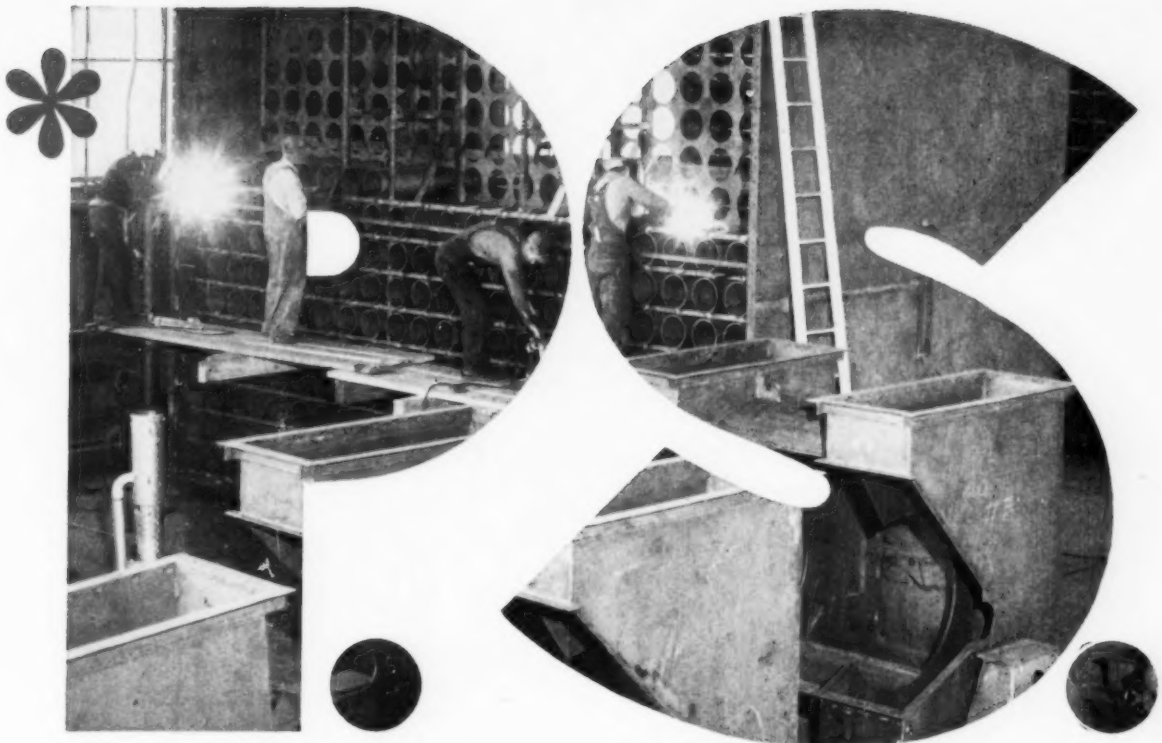
Simple in design, the coupler has a minimum of working parts. It weighs 80 lb., and measures 12 in. by 16 in. by 12 in. All Ryd-in coupler bodies are identical and interchangeable. Any two heads will couple. (68)

• Micrometal cast iron pulleys are made by The J. B. Ehrsam & Sons Manufacturing Company in diameters and face widths to meet any commercial requirements. The pulley may have solid rim and hub, solid rim and split hub, or split rim and hub. The split construction facilitates handling and permits placing on shaft or removal without disturbing shaft or bearings. (69)



• Joy Manufacturing Company has developed a new tool for dust collecting, the Joy Microdyne dust collector.

The Joy Microdyne is a cylindrical device which has two essential parts: a mixer section and an eliminator section. Contaminated air enters the dust collector through the mixing section which contains a water spray and impingement element. The central part of the unit is a water elimination section which is an axial type cyclone with turning and straightening vanes. The third section of the Microdyne is a transition area which contains the Joy axial flow fan. (70)



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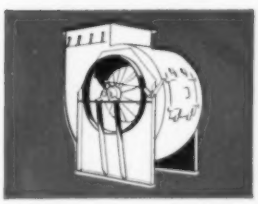
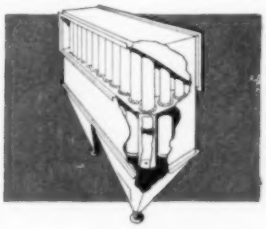
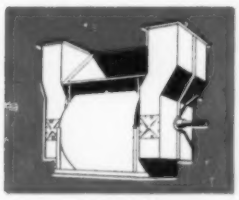
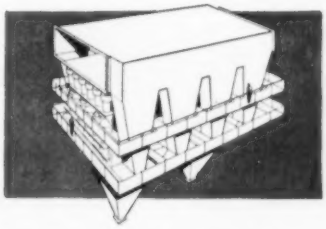
WHIRLEX *heavy-duty* industrial exhaust fans are available to handle any air moving problem. WHIRLEX *standard* forced and induced draft fans are available for boiler applications.

WHIRLEX equipment assures maximum efficiency right from the start . . . and continues to pay off with consistently low operating and maintenance costs.









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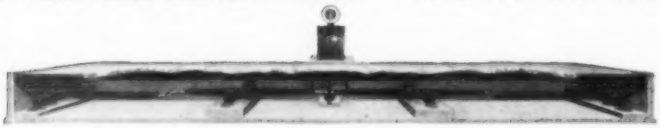

Now you can weigh those big truck loads and get *full figure printing* for each 10 pounds from zero up to 50 tons! A new Toledo Printweigh development makes this possible! This new Toledo Printweigh Truck Scale will print ten thousand different figure weight values to give you a complete capacity range. Records weights on tickets, strips or sheets. Avoids human errors.

This new Printweigh is available on *all* Toledo Hi-Weigh Truck Scales . . . the line that brings you advanced Toledo-engineered features such as integrated lever, weighbridge and pit for brute strength and long-life accuracy. Big range of sizes to 60 ft. Choice of two-section, four-section or axle load scales. Ask the local Toledo office about them or send for new bulletin number 2417. Toledo Scale Company, Toledo 1, Ohio.

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• Schramm, Inc., offers a new truck-mounted rotary drill for shot hole drilling, quarry drilling, and open pit and strip mining. Known as the Rotadrill, the unit accomplishes rotary air drilling through a reversible hydraulic motor-driven head, mounted on a carriage that rides tracks mounted on the mast.

The mast, made of heavy structural steel, is raised and lowered by hydraulic cylinders. It is 30 ft. high, with 25 ft. travel for 20 ft. 6 in. drill pipe. Holes can be drilled to 700 ft. with 4½ in. O.D. drill pipe, and to 1,500 ft. with 2⅞ in. O.D. drill pipe. Maximum down pressure is 24,000 lb., and maximum lifting pressure is 19,000 lbs. **(71)**

• A new angle dozer attachment for the Davis loader has been designed by Midwestern Industries, Inc., manufacturer of the Davis line of earth-moving and material handling equipment.

By pulling two pins, the angle dozer attachment can be offset 7 in. to either side of center. The tilt and "bite" of the blade is hydraulically controlled. The attachment has a 28-in. moldboard height and 72 in. width. **(72)**

DRAGLINE ROPE-DERRICK RO
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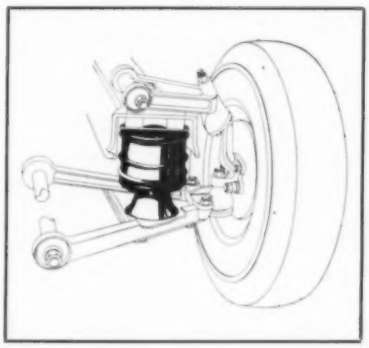
Send in your bits that need resetting, giving full details of results obtained and conditions under which the bits were used. Prompt, accurate and dependable service assures you that they will be returned new and with the diamonds "Oriented". Generally, reset bits are on their way back to the customer within three working days. In many cases, suggestions for improvements in bit performance can be made after inspection of your bits, provided full details covering their use have been received.

SPRAGUE & HENWOOD, Inc.
SCRANTON 2, PA.

• Cyclone Model No. 36, capable of drilling 4 in. to 8 in. holes to a depth of 600 ft., is offered by The Sanderson Cyclone Drill Company. It is available for truck or tractor mounting.

The new drill features a 36 ft. telescoping-type derrick and a new rubber disc-type shock top which is said to improve drilling efficiency. Two slow-speed, large-size Cat Heads, one on each side of the drilling end of the rig, increase the flexibility of the Cyclone. **(73)**



The General Tire & Rubber Company has developed a compact air spring adaptable to all suspension designs.

The new air spring is a band-diaphragm type unit—an air cell retained by a metal band to form a rolling diaphragm. The load is supported by air pressure acting against an area permitting a constant vehicle height. **(74)**

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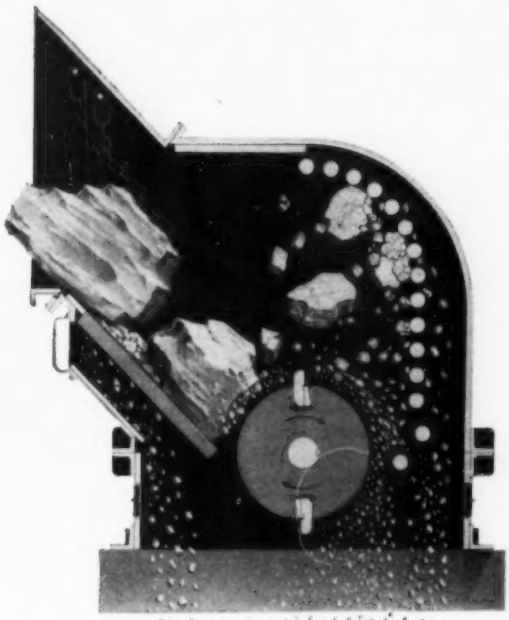
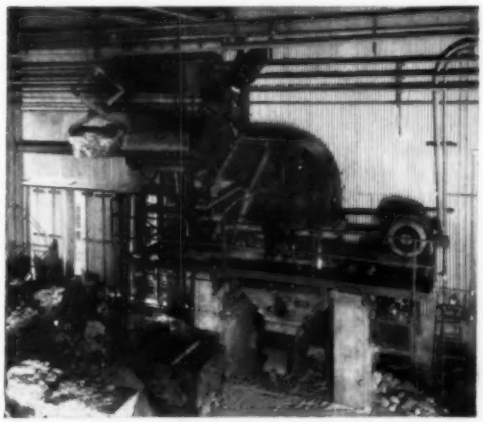


THE JEFFREY ROCK BUSTER

24-inch carbon electrodes, 6 feet long, have been fed to this Rock Buster for seven years. Plant engineers are "amazed" at its continued fine performance.



Carbide, always a difficult material to handle, is literally *exploded* by impact in the Jeffrey Rock Buster and made ready for further processing.

Superior in performance and economy, this hard-hitting giant with its high speed impeller bars strikes the material in suspension . . . continues to wallop it until it's broken down to the desired size.

Feed the Rock Buster large, friable, non-abrasive materials and they're quickly reduced to a product of market size. (No wet or sticky materials; that's a job for the Jeffrey Mud Hog.) Size of finished product can be adjusted to meet your various requirements.

Crushing elements are made of manganese steel, enabling them to stand up in the toughest service. For a copy of Bulletin 854 describing the Rock Buster, write The Jeffrey Manufacturing Company, 917 North Fourth Street, Columbus 16, Ohio.

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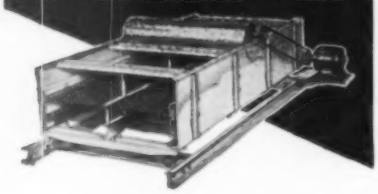

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• Four Wheel Drive Auto Company has introduced a new line of FWD carriers for crane, shovel, backhoe, and dragline. Primary carrier designed by FWD for the commercial field is a 15-ton, 6 x 4 model. The FWD line also includes 25- and 30-ton carriers.

FWD carrier construction features all steel, one-man cab alongside engine styling and heat-treated channel steel frame, reinforced throughout for increased torsional strength but with weight maintained at minimums to meet state regulations.

Basic FWD carrier drive system is 6 x 4 with independent power to each of the two rear axles. The FWD line also includes carriers with six-wheel-drive featuring the patented FWD power-proportioning center differential.

The new carriers are available with 5 or 10 speed transmission, in addition to engine and wheelbase options. (75)

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...with "Euc" Scrapers and Rear-Dumps

Euclid equipment proved its reliability and work-ability in the conversion of a peaceful farming area around Milford, Nova Scotia to a gypsum quarry.

Faced with moving a million bank yards of clay and 500,000 tons of gypsum rock, National Gypsum evaluated all makes of equipment—bought four "Euc" Scrapers, including an 18-yard Twin-Power model, and six 22-ton Rear-Dump Euclids for the rock movement. Sixteen months after the starting date, this big quarry site was stripped and graded—right on schedule. To fully clean the initial 15-acre quarry block, 7 million yards of clay are expected to be moved.

During early production at the quarry, four Rear-Dumps were hauling 5500 tons of ore to the hopper in an 8-hour shift. The haulage fleet is now composed of 10 of these reliable 22-ton "Eucs" used in the quarry and in the stripping operation in conjunction with a dragline. Six Euclid trucks currently used in the quarry deliver up to 1000 tons of gypsum per hour to the primary crusher bin.

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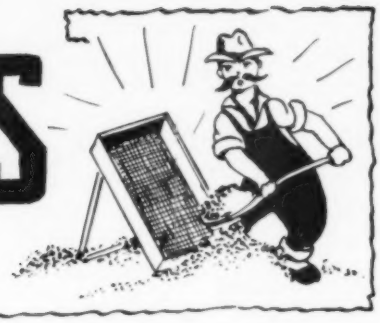


By RAY L. SMITH JR.

IF YOU CATCH a new accent in ye ed's speech, it is because he has just spent two weeks in the Florida Keys. The trip down was a fast one; 1622 miles were liquidated in 38 hours and the lady boss still has not recovered from a severe case of jitters. The return trip was a little more leisurely, stopping now and then to at least catch our breath.

At Key Colony Beach, near Marathon on Key Vaca there is a fishing pier projecting out into the Atlantic. The timbers of the old pier have been lashed by the salt waves and baked by the sun. It is a good place to loaf or fish, or to just watch others fish.

We watched an old chap whose wrinkled skin was tanned and leathery from contact with the weather. He had a squint in his eyes from looking into sun. His face broke into a ready smile. He seemed to be a very relaxed and happy man.

"What are you trying to catch?" we asked him.

"Anything that'll bite," he replied. "The ocean is full of fish, all kinds of fish. To list them would fill a big book. Around here we catch groupers, and pompano, and dolphin, and snappers, and sometimes we hook a shark or a barracuda. I get a kick out of throwing in my line and watching to see what grabs it. Sometimes I catch a parrot fish; they aren't good to eat, but gosh, they are colorful and good to look it. I just keep fishing, changing my bait now and then, and taking what I get."

Life is like that! We keep throwing out the fishlines of life hoping to hook something big like a shark. We are disappointed when we only catch a snapper. Often we get discouraged and stop trying. The old fisherman has the secret of happiness; he is contented with what he catches but never satisfied.

There are two things the Russians never seem to get—all they want and all they deserve.

Accident Prevention

STARTLING parallels in the hazards of handling dames and dynamite are drawn in Atlas Powder Company's newest film release "How to Handle Women and Explosives". This short and slightly salty film explains the inherent dangers and the imperative reasons for using approved methods in both types of operations.

It dawned on us a long time ago that it's really a woman's world, bromides to the contrary notwithstanding. But somebody should remind Atlas Powder that to the best of our knowledge there are no *approved methods* for handling this *type* of dynamite.

We hope the company will come forth with irrefutable proof that their product is any more explosive, in experienced hands, than the female of the species wearing another brand of the same stuff. At least the latter explodes at nothing, freezes in a minute and melts when properly treated.

Potpourri and Succotash

The daughter of a successful artist was being weaned from her tomboy ways and one of the items on the forbidden list was going barefoot. This was a matter of great contention between mother and child. Nevertheless, on the theory she was getting too grownup for that sort of thing, the order stuck.

One day, returning from a shopping trip for the artist's birthday, the youngster and her mother dashed impulsively into the studio —normally out of bounds for the moppet. To the mother's consternation, there stood her husband at his easel, a nude model on the dais.

There was a moment's dead silence, then came the child's triumphant voice.

"See there, Mummy?" she cried. "She's allowed to go barefoot!"

A woman at the Lincoln Park Zoo in Chicago approached the keeper and said indignantly, "The monkeys in that cage are gambling at cards. I think it's your duty to break up the game."

"Oh, they're not doing any harm, lady," soothed the keeper. "They're only playing for peanuts."

Fred Allen, while guesting on "I've Got a Secret," told the story of a Louisville farmer who was telling a friend of his about the horse he once entered in the Kentucky Derby. To make sure it would win the race, the farmer said, he fed the horse seven mint juleps before the horses went to post.

"Did the horse win?" asked his friend.

"No, but he was the happiest horse in the race!"

"What do you mean by coming home half drunk?" shouted the woman angrily.

"Couldn't help it, honey," answered the husband meekly. "I ran out of money!"

"Bartender," said the man at the rail, "this is my talking dog. I'll sell him to you for $10."

"Will you stop with that talking dog stuff?" growled the bartender. "Who do you think you're kidding?"

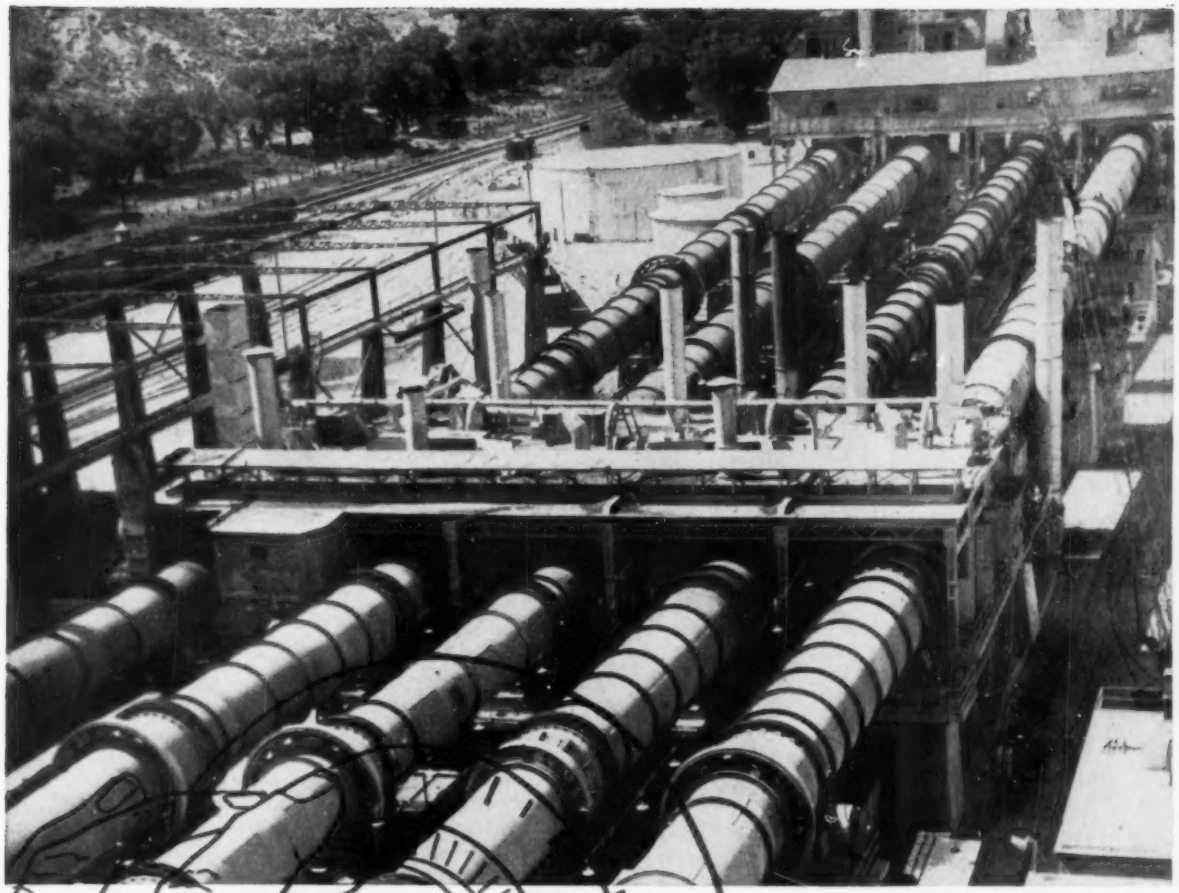
Suddenly the dog looked up with tears in his eyes. "Please buy me, sir," he pleaded. "This man is cruel —never buys me a decent meal—never gives me a bath—why, I was once the richest trick dog in America."

"I performed before kings. I was in the WAGS during the war and was decorated five times!"

"Hey," cried the bartender, "he does talk! Why sell a dog like that for $10?"

"Because," said the customer, "I'm sick to death of his lying!"

Professor: This exam will be conducted on the honor system. Please take seats three spaces apart in alternate rows.



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We have served the cement industry with top-quality rotary kiln refractories for over 25 years; we have studied needs, the trend in improved manufacturing techniques, the processes of production—both from the standpoint of the cement manufacturer and the kiln designer—and have the "*Know-How*" to recommend confidently the correct refractory and proper method of installation.

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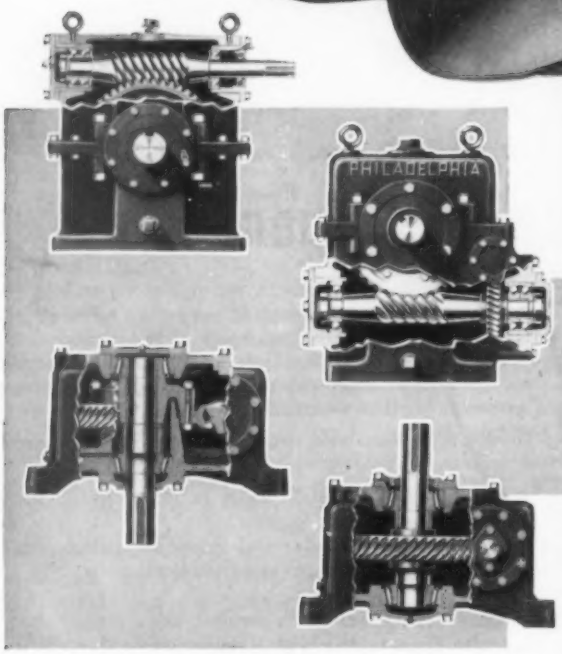
The engineering skill and knowledge put into these features alone are indicative of their entire construction.

Scientific design, unexcelled workmanship, finest materials, rugged construction, noiseless and vibrationless operation, long-life and highest efficiency—are the "end results" that have earned an enviable reputation for Philadelphia Worm Reducers.



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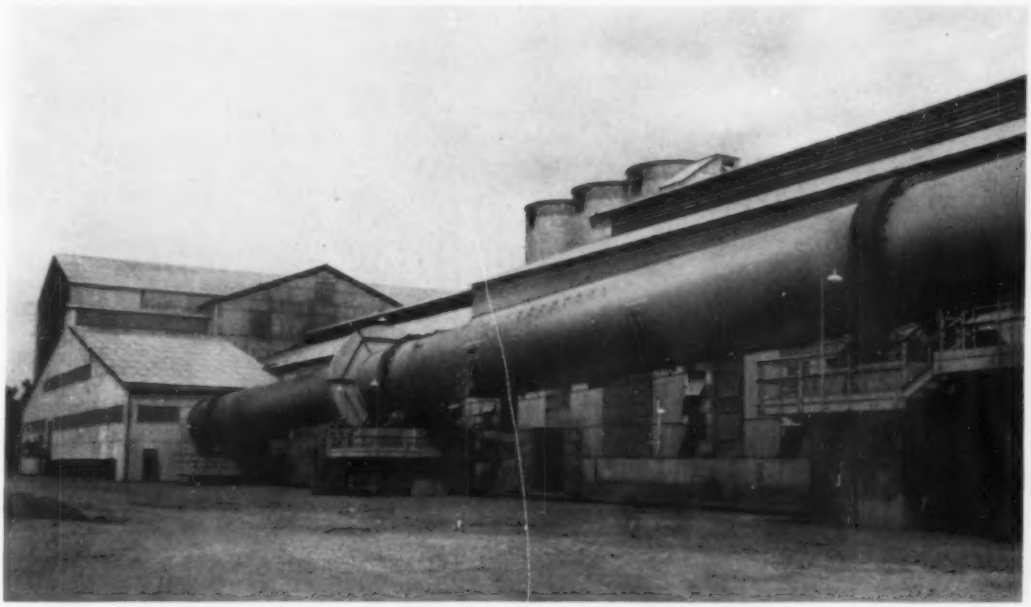

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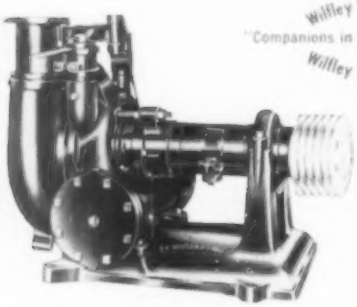
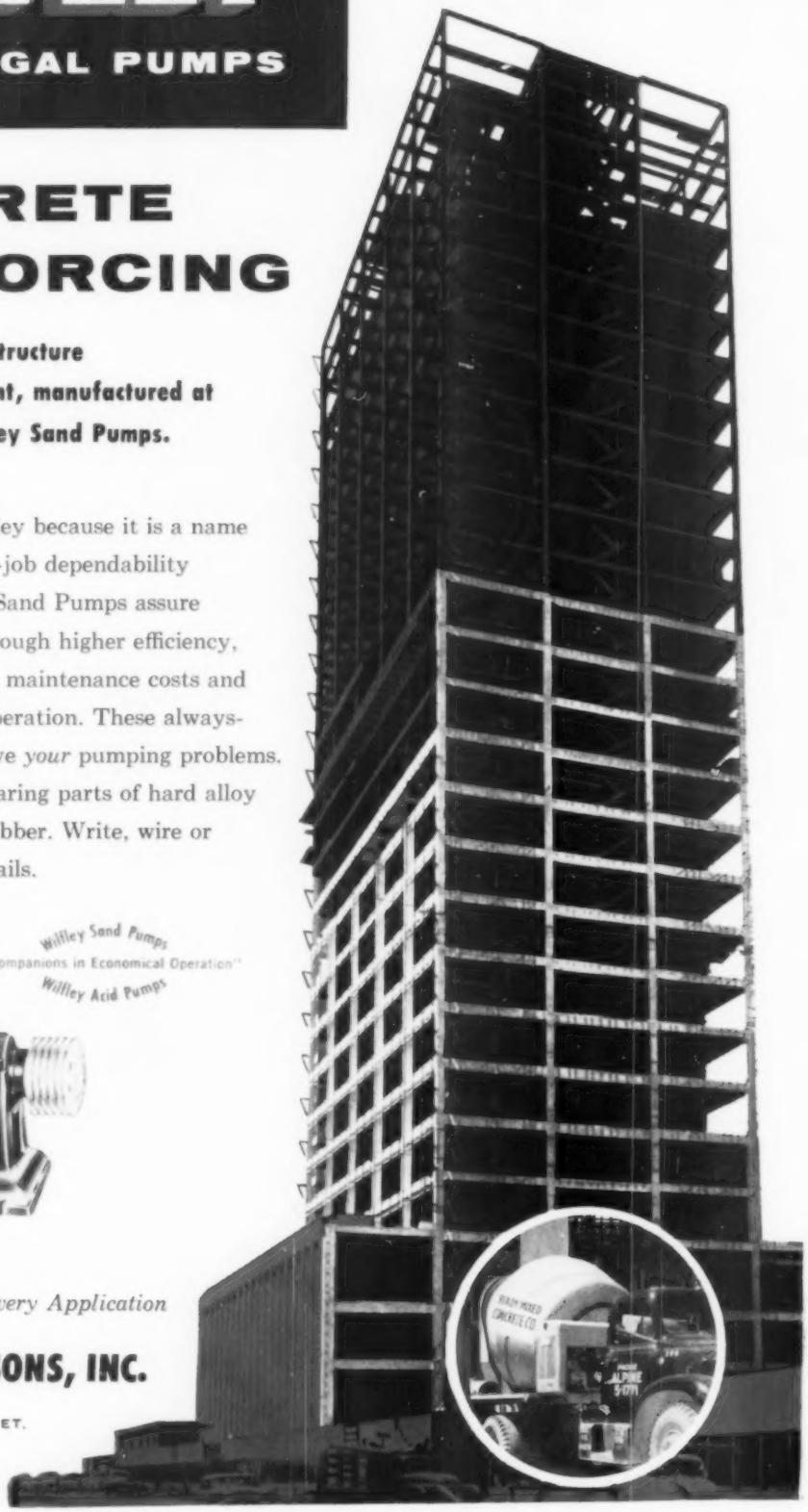


Wilfley Sand Pumps
"Companions in Economical Operation"
Wilfley Acid Pumps



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says N. D. ARMENTROUT, Quarry Superintendent, Dewey Portland Cement Co., Davenport, Iowa

"Three units work sixteen hours a day. *Eight hours hauling rock in the quarry. Eight hours stripping overburden.* All we do is change drivers.

"Tremendous load carrying ability in quarry hauling and in stripping. Have handled 39 tons without difficulty. Average payload 30-34 tons.

"Four years in brutal daily service and never a breakdown. 50% increase in quarry production to 4,500 tons per day. One full eight-hour shift eliminated."

↓ loading with six-yard shovel in quarry shuttle service

↓ loading with dragline bucket in stripping operation

↓ driver has safe view of dumping over bank in fill area

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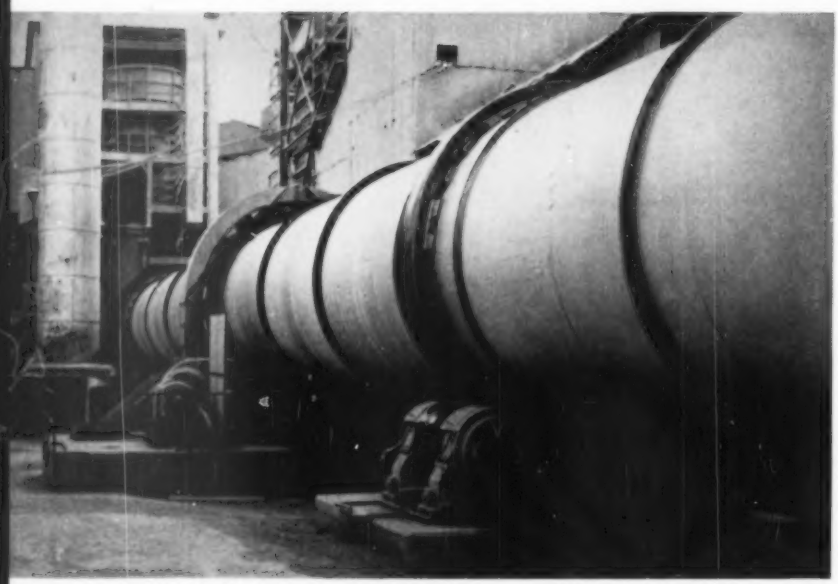


COPLAY CEMENT MFG. CO., COPLAY, PA. Dry process cement plant. 3000 bbl. per day increase in capacity, a part of Coplay's expansion and modernization project. Note GRUDEX Pre-heater in background.

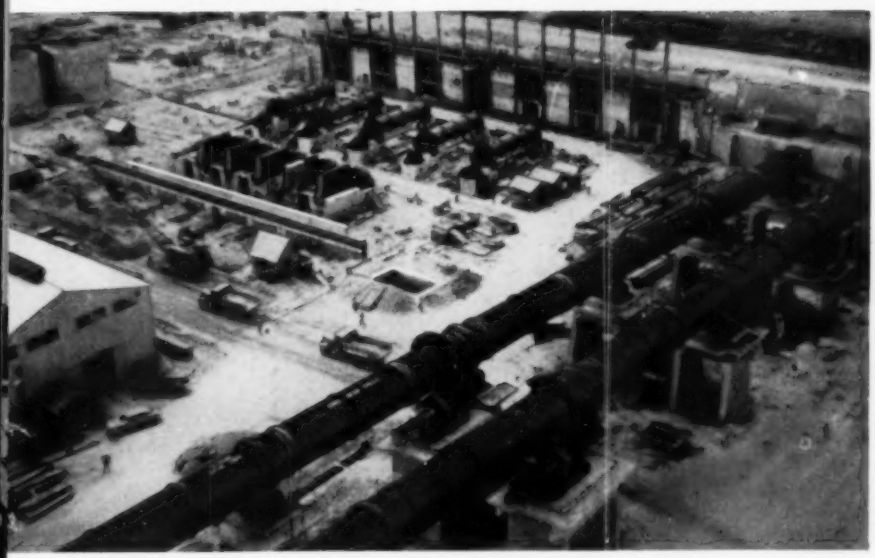
TEXAS PORTLAND CEMENT CO. 1500 bbl. per day wet process cement plant. Recently put into operation at Orange, Texas.

and EQUIPMENT

or abroad...

LAKE ONTARIO PORTLAND CEMENT CO., PICTON, ONT., CANADA. New, modern 5000 bbl. per day dry process cement plant now under construction. Scheduled to go into operation, October, 1957.

GRESIK CEMENT PLANT, INDONESIA. New, 5000 bbl. per day wet process cement plant. Scheduled to start operation, June, 1957.



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From primary and secondary stone crushing (upper left) to finished product storage (lower right), this aerial photograph illustrates all phases of the Canada Cement Company's operation at Woodstock, except the quarry.

ANOTHER ON THE SPOT REPORT

THE Canada Cement Company, Ltd., has for several months been producing cement at full capacity at its new 3,200,000-bbl., $25,000,000 wet-process plant near Woodstock, Ont. This is called Plant No. 4, but is actually No. 9 in its chain of plants extending from Exshaw, Alberta, in the Canadian Rockies to Havelock in eastern New Brunswick. It is the latest major step in the company's 10-year expansion program which has, since 1946, increased its capacity from 10,000,000 bbl. to over 24,000,000 bbl., at a cost of about $100,000,000. This new plant is located on the main line of the Canadian Pacific Railway, about 6 miles west of Woodstock and 5 miles northwest of Beachville. A connection is also available to the Canadian National Railway 4 miles south at Ingersoll.

The decision to build this plant was prompted by the rapid and continuing growth of the Canadian economy and the resulting growth of the construction industry and the demand for cement. The construction of a plant in this southwestern Ontario area had long been contemplated because it was probably the last major area of demand not within economical shipping distance of any of the company's plants.

Canada Cement had for many years held property near Beachville, a few miles from the present site, but this site had several economic disadvantages. As a result, the present property was acquired, and ground was broken for the new plant on October 28, 1955. Although the facility was designed to be an eventual 4-kiln operation, only one kiln was included in the original plans. The first clinker was produced on September 2, 1956, and the first cement was shipped on October 9.

Opposite page: This general quarry view shows the opening cut. The 6-cu. yd. walking dragline for removing clay, the 6¾-in. rotary quarry drill, and the 4½-cu. yd. shovel are shown.

canada cement company

builds 3,200,000-bbl. plant

By WALTER E. TRAUFFER

During the construction stage it was decided to double the size of this plant with a second kiln and other needed equipment. The second kiln went into operation on April 11, 1957.

The plant is noted for its size, its excellence of design and construction, its proximity to both raw materials and market, and the unlimited supply of almost perfect raw materials. There are many other noteworthy features, and the plant also boasts a number of firsts.

Beginning with the raw materials, the clay overburden over the limestone deposit is suitable and in almost the right volume for a perfect raw mix. Actually less than 1 percent of iron cinders needs to be added. The clay wash mill setup is unusual in that it must provide for the removal of boulders up to 24 in. and gravel and sand down to 20-mesh from the clay.

The general plant layout is reasonably compact, considering the fact that it is designed as an ultimate 4-kiln operation. Expansion with the minimum of labor and expense was made possible by the use of equipment of such size that ample reserve would be realized in every department. As a result, when the second kiln was installed, the only additional equipment needed was one raw-grinding mill, several quarry trucks, etc. The clay wash mill and the rock crushing and screening departments might seem to be unnecessarily far apart. However, due to the track layouts, the reservation of space for the quarry where the overburden was least, and the consideration of truck traffic to the main highway, this was the most logical layout. The only actual added cost was the amount of conveyor required to cross the railway.

Noteworthy also is the selection of longer grinding mills in both departments. The finish mills, with their lower circulating loads are expected to serve better on grinding of masonry and other fine cements than the short mills now popular. The system for pumping cement to the storage silos is also probably unique.

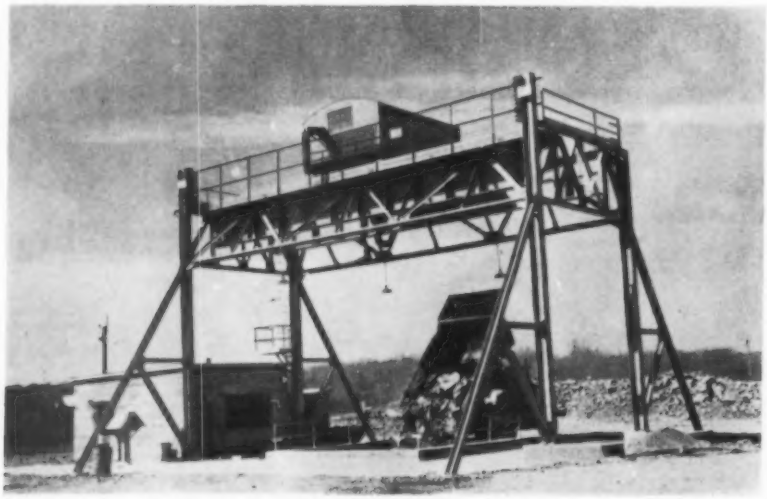
The use of two kilns differing in some respects was due to the decision to add a second kiln. The quickest way to get it was to divert to this plant a kiln intended for another of the company's operations. The system of heat exchanger crosses

in this wet kiln is one of the first in the cement industry on this continent. Both kilns have chain systems.

The cement storage silos present an unusually squat appearance, being nearly as wide as they are high. This was done only to spread out the weight on the not-too-stable clay subsoil. The really unusual feature here is the use of an aerating system for extracting the cement from the silos.

Deposit It has already been stated that this location was selected largely because it was the only place in southwestern Ontario where suitable raw materials were economically available in sufficient quantities. The deposit is overlaid with an average of 70 ft. of clay overburden but this is usable in the mix. Under this material is the bed of limestone being used, which averages over 100 ft. in thickness. This stone is in the Detroit River formation of the Devonian Age and is the same as that being quarried at Beachville and elsewhere in the Thames River Valley for lime manufacture, crushed stone, etc. It is a fine-grained, buff-colored, very pure limestone. The average analysis of the limestone and clay are about as follows:

Facilities for storing explosives used in quarrying are located within protective earthwork barriers.



A 22-cu. yd. truck dumping to the primary crusher. The framework is for the hoist and the stone hook.

Limestone

SiO_2	1.94	percent
R_2O_3	0.67	"
CaO	53.56	"
MgO	1.13	"
Loss on Ignition	42.65	"

Clay

SiO_2	46.50	percent
Al_2O_3	8.30	"
Fe_2O_3	3.27	"
CaO	17.28	"
MgO	4.63	"
Loss on Ignition	16.65	"

Under this limestone there is 40 ft. of Bertie-Akron, a cherty limestone which is not being used now but can later be blended in for a good cement mix. It is for later use with this stone that the present excess of clay is being stored away, so that it can be reclaimed. Another reason for selecting this location is that there is none of the Oriskany sandstone which in other places in this area exists in thicknesses up to 20 ft. between the clay and the Detroit River limestone.

Clay The clay overburden is a glacial till averaging 70 ft. in depth and containing up to 30 percent of sand, gravel, and boulders. It is excavated by a Bucyrus-Erie 200 W electric walking dragline with a 125-ft. boom, a 6-cu. yd. bucket, and Ward-Leonard controls. This loads to three 22-ton Euclid rear-dump trucks which are powered by Cummins diesel engines. These haul about ¾ mile to the wash mill, and the excess goes about the same distance to the waste dump, where it is being stockpiled for future use. About 2,500 tons of clay is handled in an 8-hr. shift. The wash mill is operated one 8-hr. shift from 4 p.m. to midnight, so that waste stockpiling can be done with maximum safety in daylight.

At the wash mill building the clay is dumped on rail grizzlies over the two F. L. Smidth wash mills. These grizzlies are spaced 10 in. apart on one side and 6 in. on the other, the 10 in. side being used when the boulders are running large or when there are frozen lumps. The oversize lumps are lifted by an overhead crane with a ¾-cu. yd. clamshell bucket and dropped to break them, or loaded into trucks for haul to waste.

The two wash mills are 29-ft. 6-in. in diameter and octagonal in shape; each has four harrows, rotated by a vertical 200 hp. enclosed gear drive in the center. On six of the eight sides are stationary grates through which clay slurry slops into a trough which conducts it to fine

vibrating single-deck screens, two per mill. The .095-in. opening cloth screens off any grit that is carried by the slurry, and the clear slurry drops into a sump.

The accumulated gravel in the bottom of the wash mill tub below the harrows is permitted to accumulate for 1 or 2 hours, depending on the quantity occurring and is cleared from the mills by dropping through two hydraulically-operated quadrant gates in the mill floor to two triple-deck Dillon 5- by 12-ft. vibrating screens. The top deck, with 3-in. openings, is a wear deck; the second, with ¾-in. cloth, is also a wear deck; and the bottom has .095-in. slotted-type screening. The slurry is thus screened off and returns *via* a trough to the main sump. Oversize is accumulated by belt conveyors, joining that from the fine single-deck screens, and is conveyed by a 48-in. Barber-Greene conveyor to above-ground level.

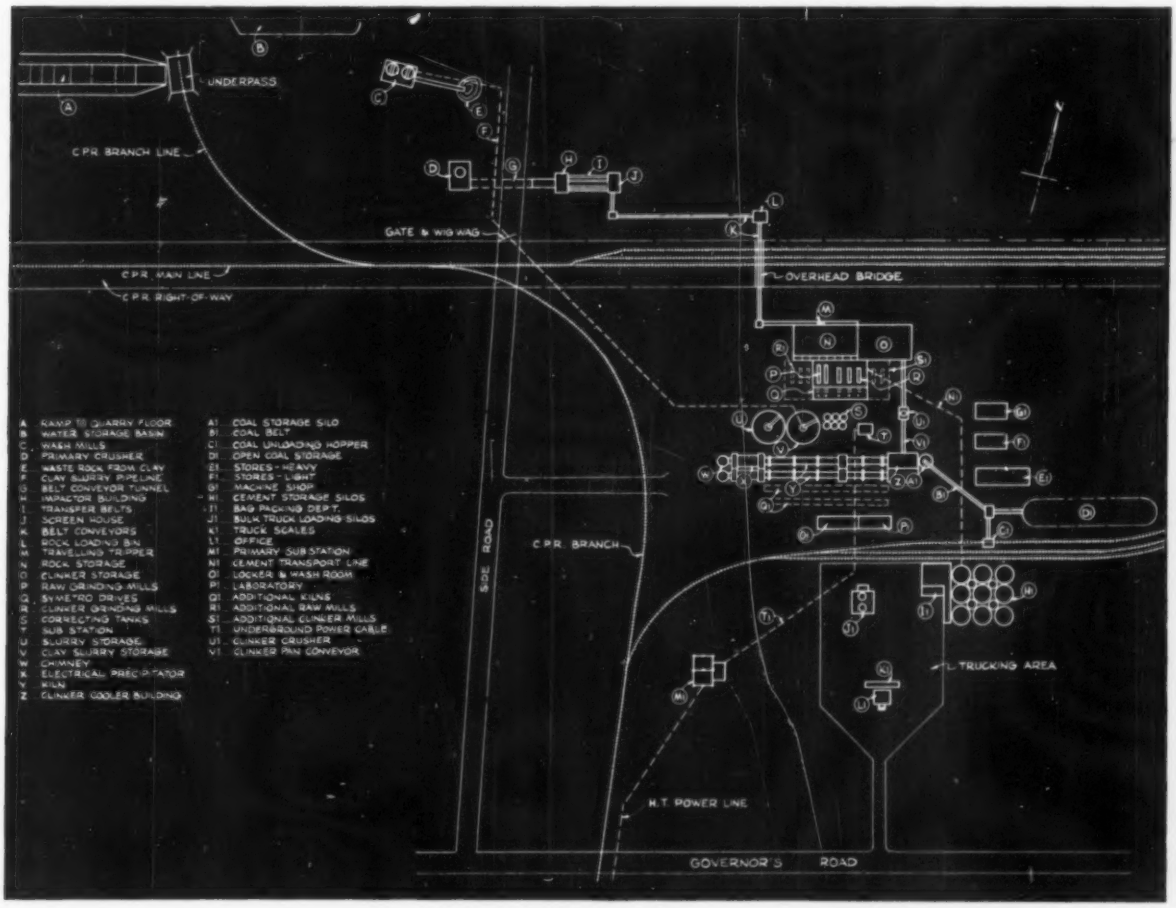
The fine clay slurry, containing around 41 percent moisture, is pumped by a pair of 6-in. Wilfley pumps at 800 g.p.m. through two 10-in. 1,800-ft. pipelines to the circular clay storage basin in the plant area.

The clay storage basin is 110 ft. in diameter by 21 ft. 6 in. deep and is equipped with an F. L. Smidth revolving mechanical and air agitator. A 6-in. Wilfley pump transfers the clay slip to a 21-ft. 6-in. diameter by 35-ft. high feed tank in the raw mill department. It is necessary to grind the clay slip with the stone because it still contains a considerable amount of fine stone and fossils.

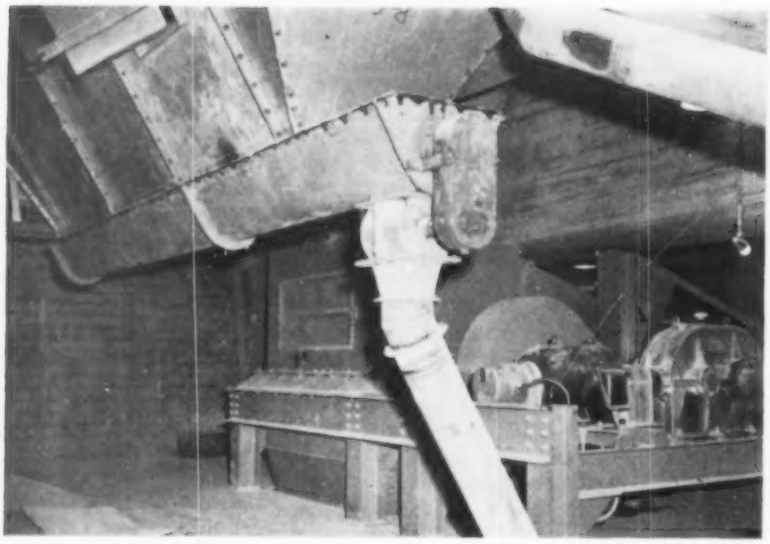
Limestone The limestone deposit is in thin and broken layers near the surface, but these become thicker and more solid further down. The deposit is being opened by means of a 140-ft. wide straight ramp to the west, which is now about 60 ft. deep. When this level has been worked back 400 ft., a 50-ft. sinking cut will be made to the 110-ft. level, including 40 ft. of the cherty limestone. This level will then be developed 400 ft. to the north.

All primary drilling is being done with a Joy 58BH Heavyweight Champion electric rotary drill using a 6¾-in. Hughes Type OWC tricone bit. In this tough and abrasive stone from 175 to 210 ft. of hole is drilled in a 7-hr. day, and the average bit life is about 2,700 ft. Blast holes are drilled with 30-ft. spacing and 27-ft. burden to a depth of 5 ft. below the 60-ft. floor. Holes are loaded with Nitrone T1 in the bottom and T4 above, averaging about 40 percent. Plastic covered wire-bound Primacord is used for down lines; and detonation is through 25 ms. relays set off with 2EB No. 8 waterproof caps by a No. 10 Beethoven exploder. The average shot of 10 holes brings down about 33,000 cu. yd. of stone. No secondary blasting has yet been necessary.

The stone is loaded by a 4½-cu. yd. Bucyrus-Erie 110B electric shovel into three 22-cu. yd. Euclid rear-dump trucks. These haul the stone



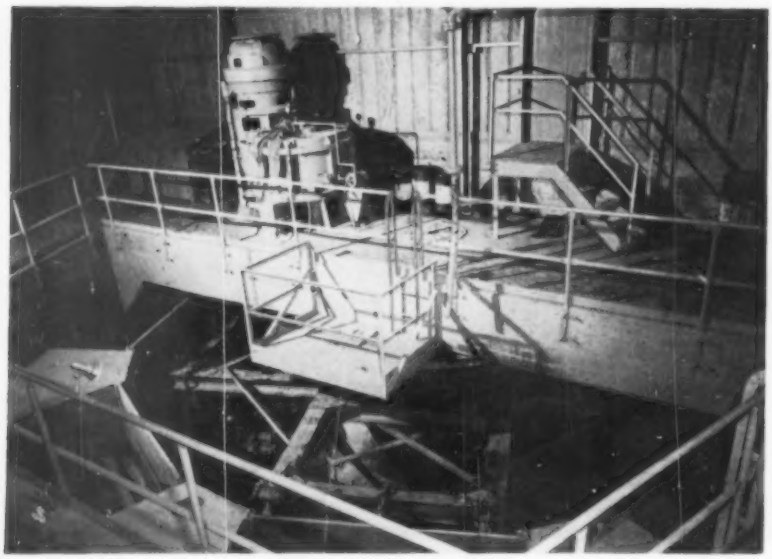
General layout of the Woodstock operation, with keyed equipment.



The dust collector in the primary crusher department, with a pan conveyor (foreground).

The secondary crushing and screening buildings, transfer house, and conveyor gallery (left background) leading to a distributing belt at the storage building.

A view down into one of the two 29-ft. 6-in. diameter clay wash mills.



about 3,000 ft. up an incline, now averaging about 7 percent, to the primary crushing station near the clay wash mill. The three trucks haul about 2,700 tons in an 8-hr. shift, ample for 24-hr. operation of the cement plant. At present, however, they are hauling in two shifts in order to build up a reserve supply.

Stone is dumped from either side into the primary crusher. On a steel framework over the crusher there is a hoist operating a 5-ton stone hook and a 56-ton crane for handling crusher parts. The 54-in. Traylor Bulldog Type 7 gyratory crusher is driven by a 375-hp. squirrel-cage motor, which is air-cooled by a Norblo fan. The minus 5¾-in. product of the crusher can be discharged to either or both of two 54-in. by 31-ft. Stephens-Adamson inclined pan conveyors, one on either side of the crusher. A Norblo Type 432 automatic bag-type dust collector is connected to all discharge points.

The pan conveyors discharge the stone on a 42-in. by 395-ft. inclined belt conveyor (No. 1) which discharges it directly into a Pennsylvania Type CB 15-50 reversible Impactor, driven by a 600-hp. motor, in the secondary crushing building. The product is carried on a 42-in. by 200-ft. inclined belt conveyor (No. 3) to a screenhouse. There the discharge is split to a pair of 5- by 14-ft. Dillon single-deck screens with ⅜- by 5-in. slotted wire cloth. The oversize is carried on a 36-in. by 200-ft. inclined belt conveyor (No. 5) back to the Impactor in a closed circuit. The Impactor building and the screenhouse are kept clean by Norblo automatic bag-type dust collectors—No. 312-A and No. 390-A, respectively. Jeffrey Impact idlers are used on the belt conveyors at all impact loading points.

The minus ½-in. stone through the screen is carried on two 42-in. belt conveyors (No. 9 and 10), 100 ft. and 560 ft. long, respectively, to the stone bulk-loading tower. This structure has a 500-ton bin with chutes for loading cars on a siding yet to be installed. This arrangement will make it possible to ship stone to any of the company's other plants if and when desired.

Stone for the cement plant bypasses this bin onto a ½-in. by 315-ft. horizontal belt conveyor (No. 11) which crosses the main line of the railroad at an elevation of 54 ft. The stone is discharged on the distributing conveyor (No. 12) which is mounted on one sidewall of the stor-

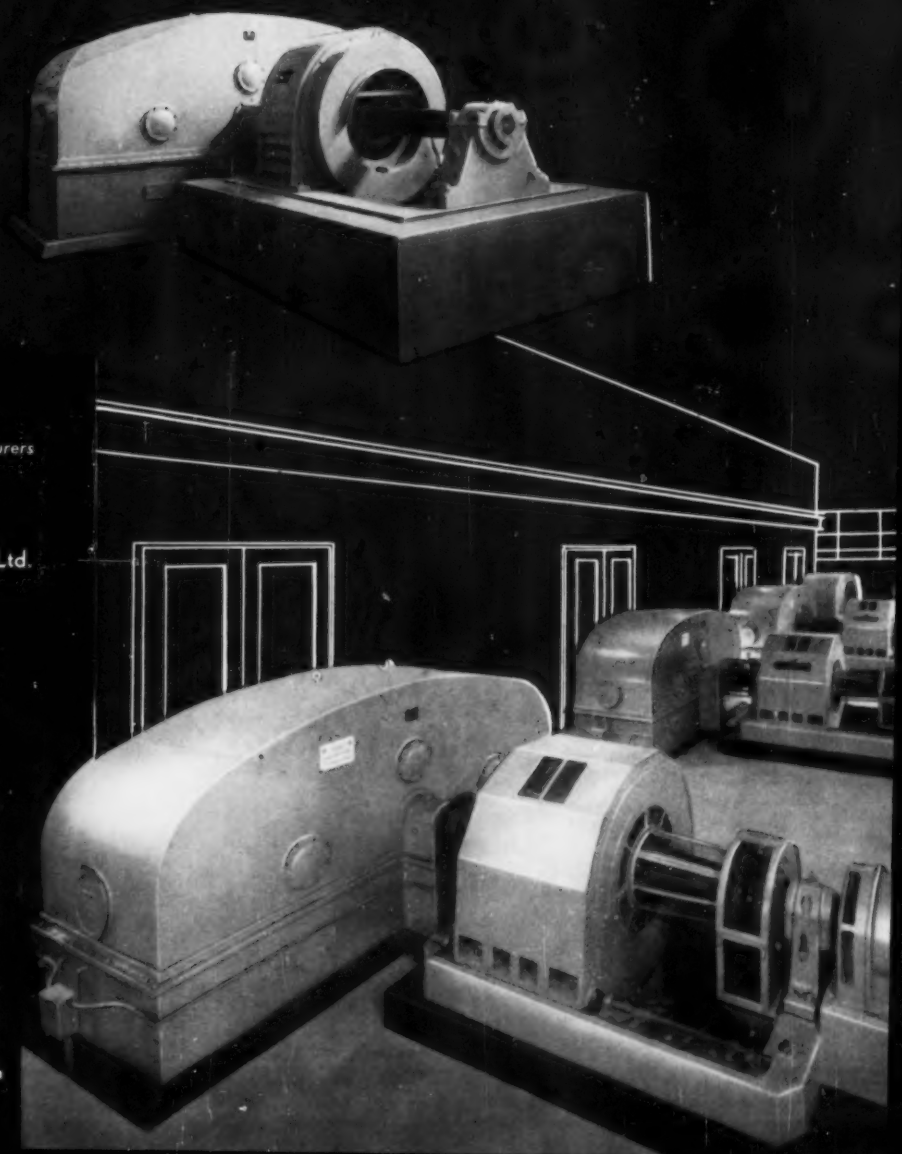
SMIDTH

symetro drives

Years of continuous, reliable performance at highest efficiency and negligible maintenance.

Gears are precision cut, dip lubricated, no oil pumps or coolers required.

Symetro Drives and motors often installed in a separate room eliminating dust and noise.



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105, Piccadilly,
London, W. 1, England

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Paris (9e) France

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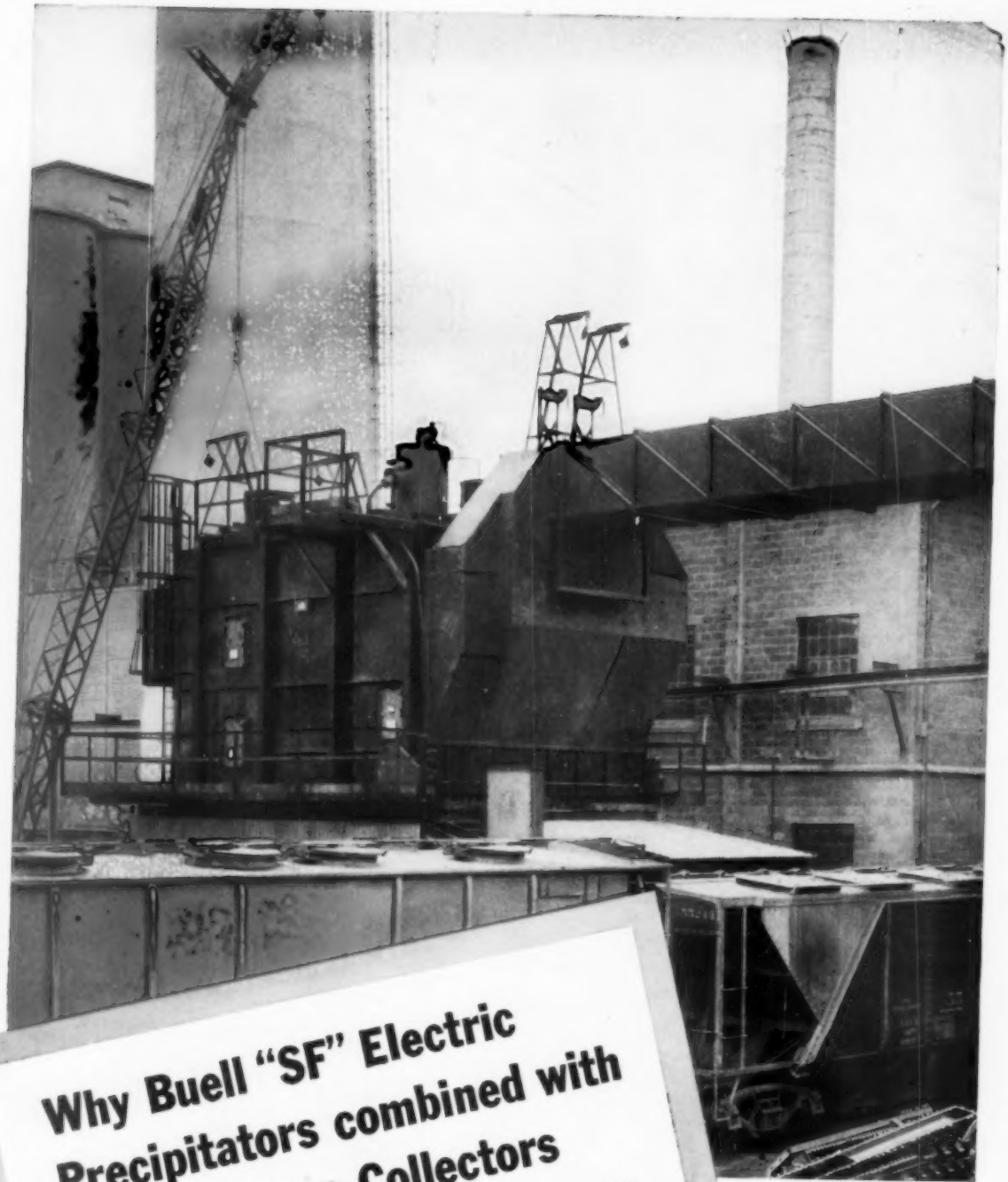
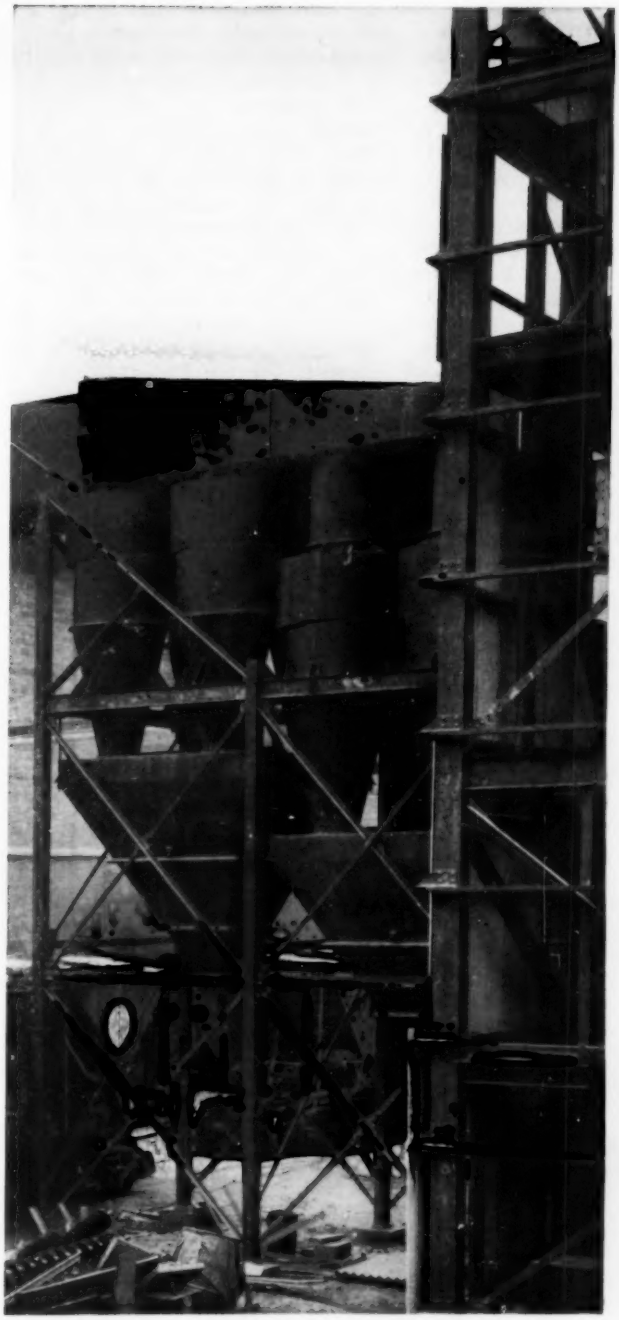


Why Buell "SF" Electric Precipitators combined with Buell Cyclone Collectors assure an extra percentage of EFFICIENCY

MECHANICAL ELECTRICAL *Experts at delivering*



When Buell "SF" Electric Precipitators and Buell Cyclone Collectors are installed in tandem ... you have the ultimate in efficiency *under all conditions*. Because their basic principles of operation are different, they complement each other in such a manner as to provide two important advantages: (1) increased efficiency, and (2), improved stability. For example, changes in the characteristics of dust particles or gases will not appreciably affect the percentage of efficiency of the combined units.

Buell "SF" Electric Precipitators with their exclusive "Spiralectrodes" are unequaled in the recovery of fine dust particles. Featuring continuous rapping and many other exclusive design advantages, they are your guarantee of that all-important extra percentage of efficiency—often the difference between a highly profitable recovery operation and a break-even one.

Buell Cyclone Collectors with their large diameter, clog-proof design, also offer you the kind of efficiency that results in many extra tons of recovered valuable dust. Whereas the secondary air currents in most collectors tend to lower efficiency, Buell's exclusive shave-off design utilizes them to recover more dust.

For detailed information on how Buell equipment is delivering that all-important extra percentage of efficiency in the cement and lime industry, write Dept. G-18, Buell Engineering Company, 70 Pine Street, New York 5, New York.

Free Booklet

Describes all three Buell Systems for the recovery of valuable dusts.

buell®

Extra Efficiency in **DUST RECOVERY SYSTEMS**

age building. This is a 42-in. by 470-ft. horizontal conveyor with a traveling tripper for discharging either into the storage building or onto an outside stockpile.

Materials Storage The 120- by 425-ft. materials storage building is not roofed over but it has two retaining walls extending its full length, one supporting the stone conveyors and the other at the mill feed bins. These walls also support the rails for the 120-ft. span overhead traveling crane, which does all materials handling to and from storage. This is a 20-ton Provincial Engineering Company crane handling a 5-cu. yd. Blaw-Knox clamshell bucket, and operated through full Ward-Leonard variable voltage control. A 210-ft. long section of the storage holds about 31,000 tons of limestone, a 190-ft. section holds about 130,000 bbl. of clinker, and there is space for about 1,000 tons of iron pyrites and 1,000 tons of gypsum. The iron pyrites are received by rail, and the gypsum by truck.

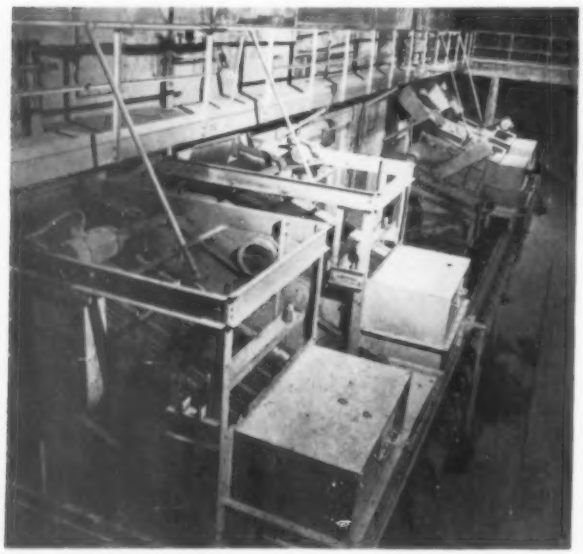
Raw Grinding Along one side of the storage are the raw- and finish-mill feed bins. There are two 200-ton iron pyrite bins and three 200-ton stone bins, to take care of the two original raw mills and the third mill recently added. Under each stone bin is an F. L. Smidth Pendan laminated metal belt feeder of a type new on this continent. This feeder is controlled by mechanical variable-speed transmission, and the belt speed is automatically regulated by any variations in weight. A drag-chain-type reciprocating feeder is used under the pyrite bins. Its speed is varied with the depth of the material, and the rate of feed can be adjusted by means of a ratchet. The iron pyrites form about 1 percent of the mix. Short belt conveyors discharge these materials into the mill feed chutes. The clay slip, with 41 percent moisture, is pumped from the clay tank to variable speed ferris wheel feeders which feed measured quantities to the raw mills.

One of the three Smidth 3-compartment Unidan mills is an 8- by 46-ft. unit with slide shoes on the feed end only. The other two are 8-ft. 6-in. by 39-ft. 6-in. trunnion type mills. All are fed limestone, iron pyrites, and clay slip in the desired proportions, plus enough water to make the desired slurry consistency. The slide shoe mill is fed direct to its first chamber; the two trunnion-type mills are fed through their trunnions by spiral feed drums. The feed-end trunnion bearings are also movable on rollers to allow for expansion or contraction. The trunnion-type mills have a new spiral-wave-type liner in their third compartment. Ball loadings are indicated in the reference below.

The mills are driven at 20.5 r.p.m. by 1,100-hp. 720-r.p.m. motors through Smidth Symetro gear reducers with a 35 to 1 reduction ratio. These are of a new and compact type of synchronous motor no larger than the 500-hp. motors of a few years ago. Two are General Electric and the other is Westinghouse. Each motor has its own d.-c. exciter and is fully automatic; starting is by pushbutton; and as the motor comes up to speed, it synchronizes automatically. These motors and the three identical finish-mill motors are in a separate room

	Slide Shoe Mill			Trunnion-Type Mill		
Size	**Compart. 1**	**Compart. 2**	**Compart. 3**	**Compart. 1**	**Compart. 2**	**Compart. 3**
3-in.	17,000 lb.			15,000 lb.		
2½-in.	14,000 lb.			16,000 lb.		
2-in.	14,000 lb.			10,000 lb.		
1½-in.		26,000 lb.			21,000 lb.	
1¼-in.		14,000 lb.			10,000 lb.	
1-in.			67,000 lb.			82,000 lb.
		Totals	152,000 lb.			154,000 lb.

Below: Each wash mill discharges over a pair of screens to sump. A conveyor (below) carries away oversize.

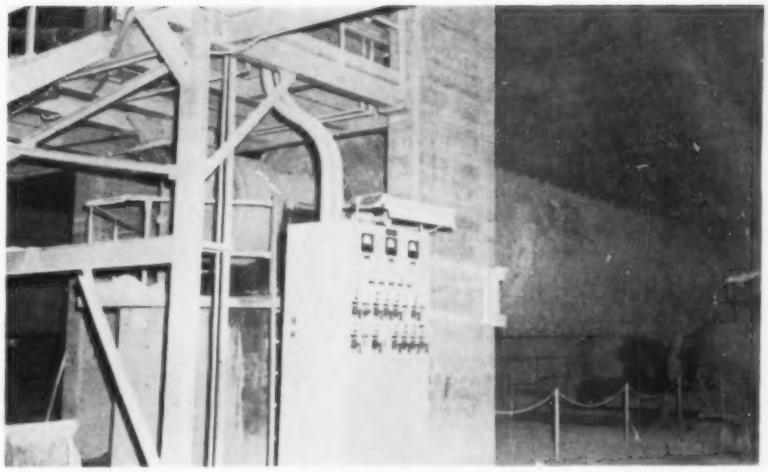


The 110-ft. diameter clay slip basin, and the slurry storage basin (background).

beside the mill room, along with their speed reducers and switchgear.

Slurry is ground to at least 90 percent through 200-mesh, and moisture content is held within 1 percent of 37 percent. Each mill grinds at the rate of about 160 bbl. per hr. All of the slurry goes to a sump from which a 6-in. Wilfley pump feeds to six 1,400-bbl. correcting tanks. Agitation is provided by air at 45 lb. pressure introduced at the discharge cone.

Slurry is recirculated and withdrawn from these tanks as needed to get the desired blend. Two 8-in. Wilfley pumps do the recirculating. One of these and a third 8-in. pump are used to feed the blended slurry to a slurry storage basin which is identical with the clay slip storage basin. It is 110 ft. in diameter by 21 ft. 6 in. deep and has a Smidth revolving mechanical and air agitator. When filled to a depth of 20 ft., it has a capacity of 23,000 bbl. A 6-in. Wilfley pump feeds the slurry to the two ferris wheel kiln feeders from which overflow is returned by gravity to the basin. At each pumping station there is a second slurry pump as a spare.



One of the three raw grinding ball mills and its control board (foreground).

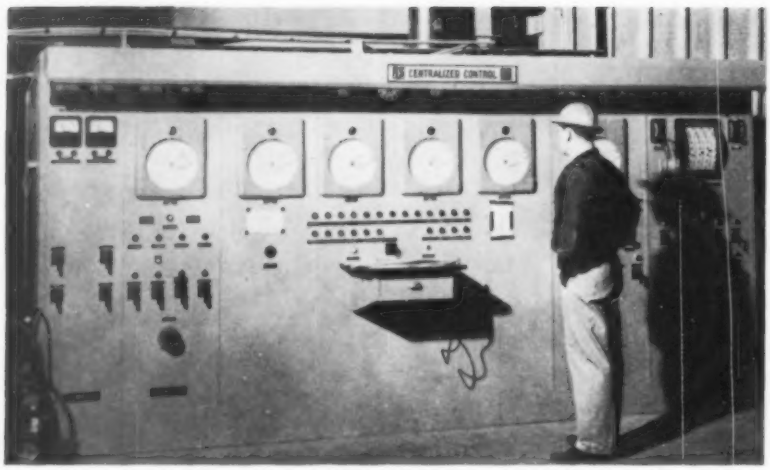
Kilns The two 12- by 450-ft. F. L. Smidth kilns are all-welded and are mounted on six piers, with a single oil-lubricated roll on each side. The shells are 1 and 1½ in. thick except at the tires, where they are 2½ in. Kiln No. 1 has fewer stiffening rings than kiln No. 2, but has heavier tires to compensate. The gear ring spring plates are welded to the kiln shells. Each has rope-tightening seal ring at the feed end; and the stationary hoods are accessible through doors suspended on tracks. Each kiln has a slope of ½ in. per ft. and is driven, usually at 56 r.p.h., by a 90/200-hp. 300/1200 r.p.m. d.-c. motor through a Dominion gear reducer and a Smidth No. 190 gear box, both with pneumatic atomizing spray lubricating systems. The kiln feeders are synchronized with the kiln drives through Ward-Leonard control systems which can be set for any desired ratio. Each kiln has an auxiliary drive to be used in emergencies to keep the kiln turning slowly. This consists of a gasoline engine and a reducer which can be connected to the high-speed shaft of the main drive reducer.

Both kilns are similarly lined, having (beginning at the feed end) 112 ft. of 6-in. Duro wear-resistant firebrick (which includes the chain section); 90 ft. of 6-in. insulating firebrick; 139 ft. of 9-in. high-duty (40 percent alumina) firebrick; 36 ft. of 9-in. (70 percent alumina); 61 ft. of 9-in. Magnecon basic brick; and 12 ft. of 12-in. high-duty firebrick.

Here the similarity between the two kilns ends. The No. 1 kiln has an F. L. Smidth Valby chain system which is 70 ft. long, beginning 13 ft. from the feed end. The chains are suspended from 36 supporting rings spaced 2 ft. apart. Each ring has 27 chains, for a total of 810, each 14 ft. 11 in. long, equally spaced around it and attached to the fourth ring following at a point one-third way around, rotationwise. Special ¾-in. distorted chains are used, and they are attached to the rings by means of split links. Actually only 33 rings are now used, leaving three for future extension of the chain system if this should be necessary.

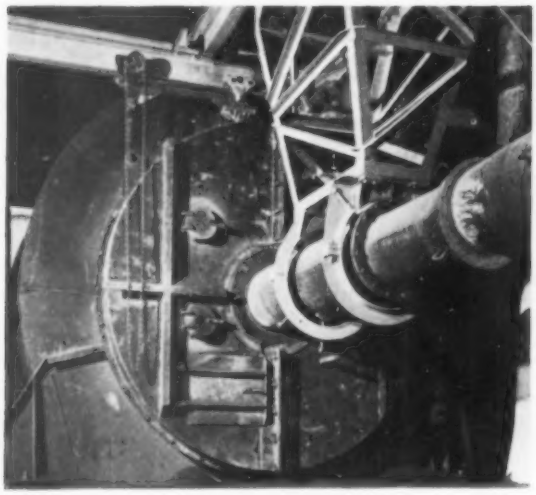
In the No. 2 kiln a chain system of Smidth design starts 15 ft. from the feed end. There are 44 rings installed, spaced 2 ft. apart, but only 36 are now used, beginning with No. 2 and ending at No. 37. As in the other kiln, there are 27 chains per circle, each 14 ft. long, and sus-

A view between the two 12- by 450-ft. kilns, showing the coal conveyor (right background), the coal mill feed silos (center background), and the conveyor (left) to the clinker crusher.

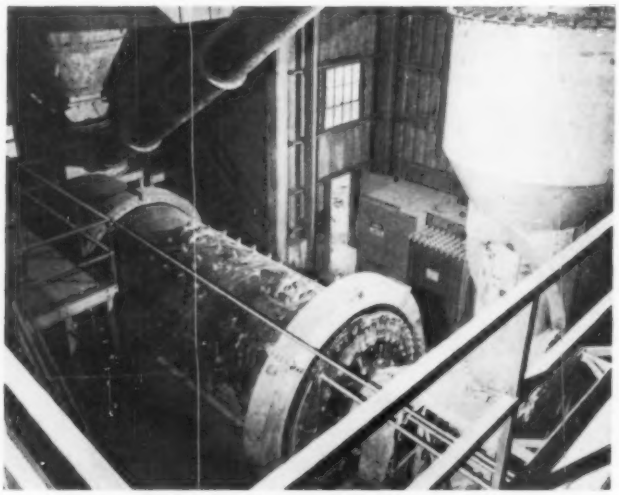


One of the two central control panels from which the kilns and appurtenant equipment are operated.

This heat exchanger system in kiln No. 2 is one of the first in the cement industry on this continent.



A closeup of the burner pipe and hood for one of the two new kilns.



One of the two 7 ft. 2 in. by 24 ft. 9 in. air swept coal mills with feed silo in background.

pended from the fourth following ring, but 8 holes farther around. Every second chain is double, making a total of 1,280 altogether. This arrangement results in a 60-in. diameter tunnel in the kiln, as compared to 50-in. in the No. 1 kiln.

The chain system in the No. 2 kiln is followed by a quadrant-type heat exchanger. This begins 90 ft. from the feed end of the kiln and is 32 ft. 6 in. long. The quadrants or crosses are made of 1-in. thick stainless steel plate, and 3-in. high flights help to propel the material through the four sections. Special flights at each end help to get the material in and out.

Gases The exhaust gases leaving each kiln go through a dust chamber into a plenum chamber. This area is split into two sections, each with a hopper. Following the plenum chamber is a Precipitation Corp. of Canada electrical precipitator of standard design, rated at 260,000 c.f.m. Following the precipitator is another split plenum chamber with separate ducts to two 130,000-c.f.m. fans. The split plenum chambers and the divided precipitator make it possible for either half to be used independently of the other when maintenance work is necessary. Draft control louvres precede the fans. Both fans lead to a common duct to the kiln stack. Both stacks, built by the Custodis Chimney Company, are 200 ft. high and 13 ft. I. D. at the top. The stacks are of reinforced concrete construction and have independent brick linings.

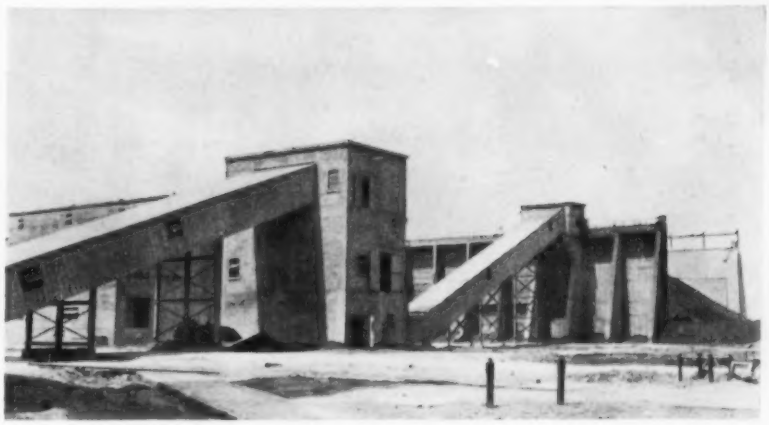
Four cross screw conveyors, one under the first plenum chamber and one under each of the three double precipitator sections, feed the collected dust to a main collecting screw conveyor for return to the kiln. The dust from the third precipitator sections has been used, and no alkali problem has resulted. Whenever necessary, this dust can be diverted and wasted.

A bucket elevator feeds the collected dust into the kiln *via* a dust return scoop feeder. This is at a point just beyond the chain section on Kiln No. 1 and just beyond the cross section on Kiln No. 2. On Kiln No. 1 about 375 lb. of dust is reclaimed per minute; no figures are available on Kiln No. 2, but they are known to be higher.

Cooler Clinker is discharged from each kiln into a 7- by 44-ft. Fuller inclined-grate clinker cooler. This has three compartments, and two fans provide the cooling air, one for the first compartment and the other for the second and third. The cooler is provided with automatic controls responding to secondary air temperatures; over-grate pressure or hood draft controls on grate speed and air volume are by the Bailey Meter Company.

The clinker is discharged from the cooler through a hammermill breaker at a temperature of about 120 deg. F. A series of two pan conveyors takes the clinker from both coolers to a 4-ft. Symons Standard cone crusher which is set at ⅝-in. opening. This can be bypassed if desired; another pan conveyor then discharges the clinker into the storage building. The clinker crusher building is connected to a Norblo No. 432-A bag-type collector.

Coal The coal used for firing the kilns is a semi-bituminous Pennsylvania product testing 13,500 B.t.u., 8.9 percent ash, and 2.75 percent sulphur. It is trucked from a dock on Lake Erie to the plant. There it is dumped to a stockpile on a concrete slab or to a hopper, from which a belt conveyor carries it to the top of a 500-ton concrete



The clinker crusher building, with storage in the background.

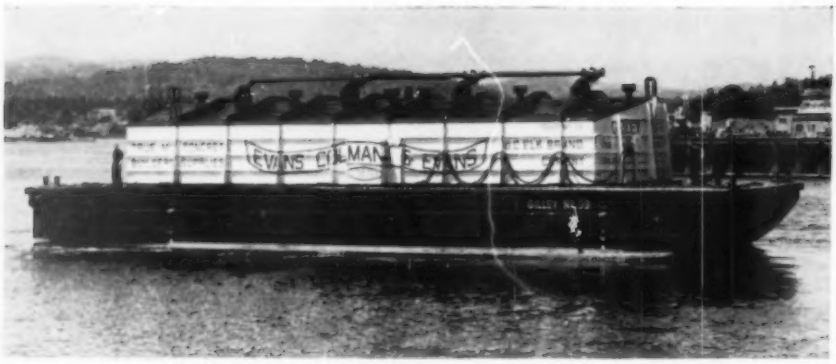
silo in the kiln building. A cross conveyor feeds to a second silo. These silos have conical steel bottoms, and electric vibrators are used to insure a steady discharge. From each silo a table feeder discharges the coal into a chute to an F. L. Smidth 7-ft. 2-in. by 24-ft. 9-in. Tirax air-swept coal mill. The first chamber in each mill is used for drying with air brought *via* cyclones from the clinker coolers. The second and third compartments do the grinding. Their ball load is as follows:

Size	Compartment No. 2	No. 3
2-in.	5,500 lb.	
1½-in.	5,500 lb.	
1¼-in.	2,500 lb.	
1-in.		10,500 lb.
¾-in.		10,000 lb.
		Totals 34,000 lb.

Another view of the plant area, showing the general-purpose and laboratory building at the left.

The coal is ground to a fineness of 90 percent through 100-mesh, with 85 percent retained on 200-mesh. It is blown from the third compartment of the mill into a stationary vertical classifier or cyclone, which returns the coarse into the mill. This classifier has no moving parts but is adjustable to control fineness. The coal and air are blown to the kiln burner pipe. The temperature of the primary air leaving the mill is automatically controlled, at any desired point between 150 and 190 deg. F., by a Bailey control actuating a tempering air damper in the air pipe following the classifier.

The burner pipes for the two kilns differ in design but both are 15 in. I.D. and extend 1½ ft. into the kilns. The No. 1 kiln pipe is inclosed in another pipe, which leaves a 2-in. annular space for cooling air. The first 9 ft. of both pipes is No. 309 stainless steel. The No. 2 kiln burner pipe is similar, but the 1½-in. annular space is filled with in-



Fuller develops self-unloading

Close-up showing loading conveying line and diverting valves on top. Unloading line from Fuller-Kinyon Pump extending through deck, lower right. Electrical cables for connection on shore, left.

To meet demand for faster and more efficient water transportation of bulk Portland cement, Fuller engineers came up with the answer . . . the all-pneumatic, self-unloading barge for Gilley Bros. Limited of New Westminster, British Columbia.

The barge is completely self-contained, with all unloading equipment and accessories on board. The hold comprises eight V-bottom hoppers, each equipped with open type F-H Airslide® fluidizing conveyors. Enclosed type Airslides convey from the hoppers to a Fuller-Kinyon stationary pump installed underneath the hoppers, the pump conveying the cargo to storage on shore. No mechanical equipment is used for conveying. Incidentally, the barge is also loaded by a Fuller-Kinyon system.

Barge tied-up at pier unloading to storage on shore. Note flexible hose from barge, left, connected to permanent conveying pipe line leading into storage bin at left.

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SUBSIDIARY OF GENERAL AMERICAN TRANSPORTATION CORPORATION
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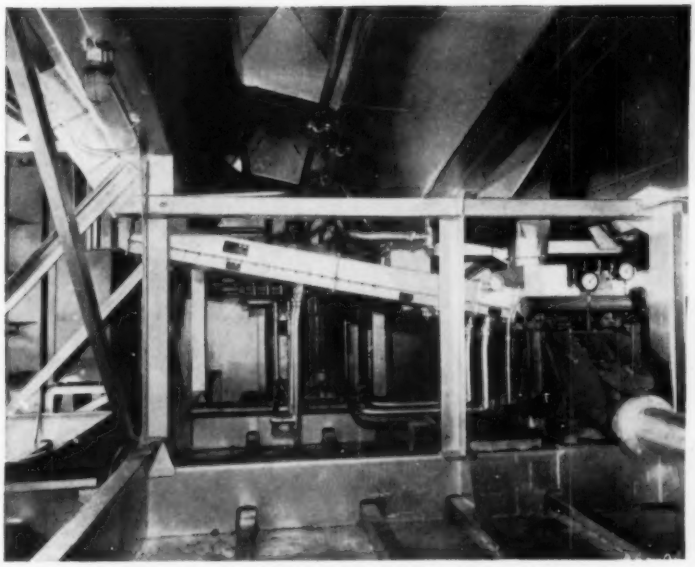
first all-pneumatic, bulk cement barge



Fuller-Kinyon pump, right, underneath hoppers. Note enclosed type Airslides for delivering cement from hoppers to pump.

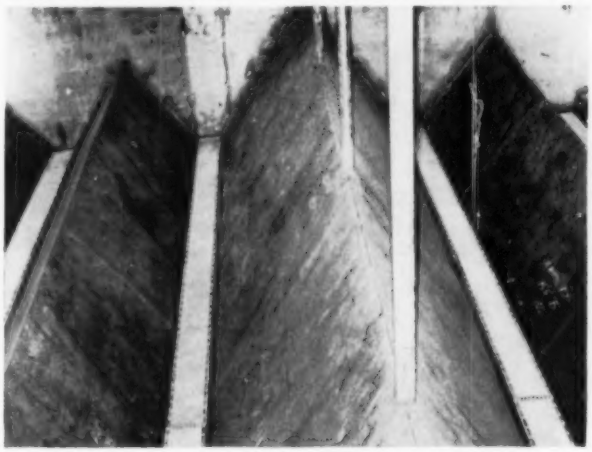
This barge has a carrying capacity of 4500 barrels and can be unloaded at rate of 450 to 600 barrels an hour, depending upon local conditions and distance of conveying. One very important feature is the fact that the cargo is completely unloaded, leaving practically no residue in the hoppers. Unloading requires only the part time attention of one operator.

Two 15 horsepower blowers furnish air to the Airslides and a Fuller Rotary Single-stage Compressor furnishes air at 30 pounds to the Fuller-Kinyon Pump.

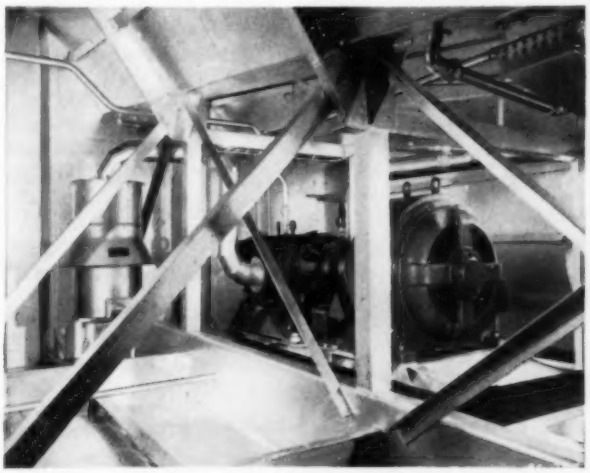
The initial unloading of the Gilley Brothers barge with a cargo of 4300 barrels was highly successful, complete discharge taking not over 8-1/2 hours. This performance has resulted in the purchase of a second barge of 5000 barrels capacity.

Here is but one example of how Fuller ingenuity and equipment are being put to work to help you cut costs and increase production.

When you have a problem of conveying dry bulk materials, Fuller engineers will gladly make a study of your conditions and submit suggestions . . . this without any obligation on your part.



Looking down into the four V-bottom hoppers comprising one end of the barge, showing open type Airslides.



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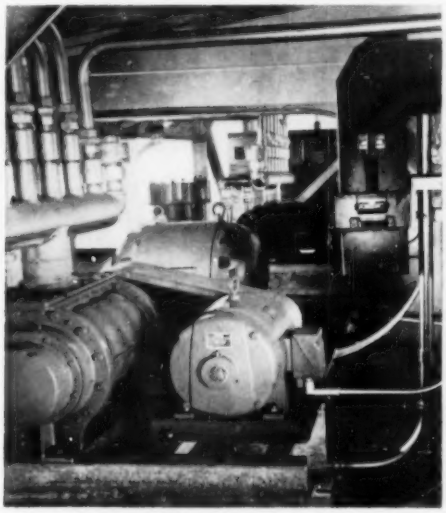
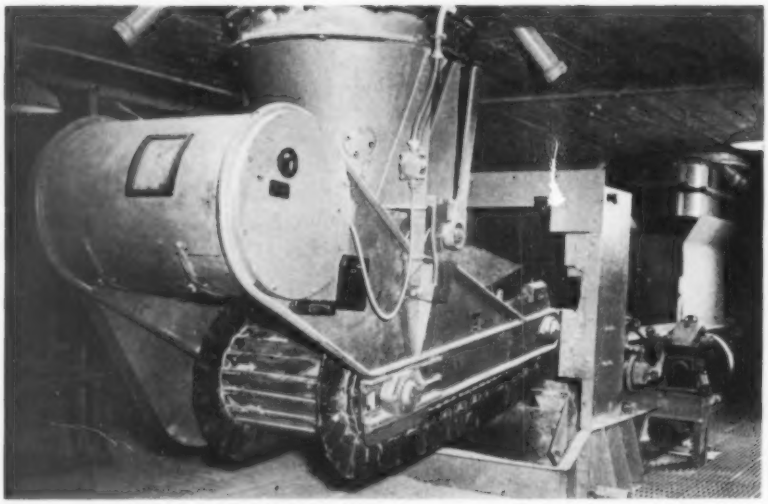
Fuller rotary single-stage compressor which supplies air to the Fuller-Kinyon pump for unloading cargo to storage on shore.



Blowers which supply air for the F-H Airslides.



Variator-controlled feeders proportion the clinker and gypsum to the finish mills.

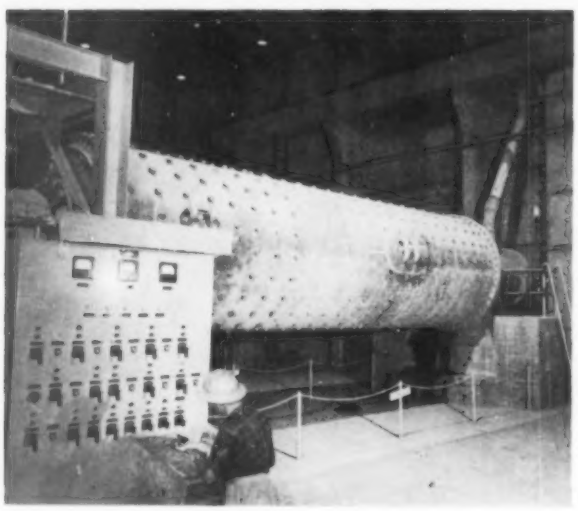
sulating material. The outer pipe forms a wear plate ½-in. thick on the bottom and ¼ in. elsewhere.

Burning Control Each kiln has an F. L. Smidth central control panel which is pressurized behind the instrument board with filtered air. The feature of this very complete panel is the system of Bailey air-operated controls, already described, which automatically control the kiln hood draft and the coal mill temperature. A similar control will be used on the No. 1 cooler fan damper. The coal damper is hand operated by a Bailey control.

Operating procedure is to run the kiln at a set speed—now 56 r.p.h.—and keep the rate of feed constant. The feed end temperature is set for best results, and the coal feed rate is varied only when the quality of the coal changes. An oxygen analyzer and these automatic controls help to maintain the desired conditions. Due to the large diameter of these kilns, the hood draft is held near minus 0.4 in., and the back end draft near minus 5 in.

Conditions are somewhat different in the two kilns, as would be expected because of their different interior design. In Kiln No. 1 the slurry leaving the chain system contains about 5 percent moisture, and the exit gas temperature is about 800 deg. F. In Kiln No. 2 the slurry leaves the chain system dry. The gas temperature entering the quadrant system is about 1,900 deg. F. and leaving it is about 1,500 deg. F; and the kiln exit gas temperature is about 575 deg. F. Burning zone temperature in both kilns is held at about 2,575 deg. F. by photo-electric pyrometers.

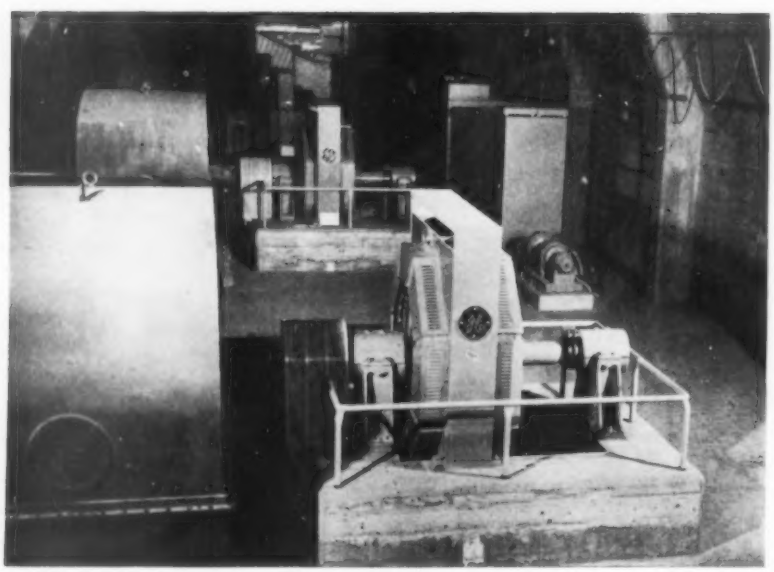
It is too early for definite results to be available, but the No. 2 kiln does operate more uniformly, with a lower fuel rate and somewhat higher capacity. The No. 1 kiln has averaged 85 lb. of coal per bbl. under present forced production to date, but better results are expected as the plant is tuned up.



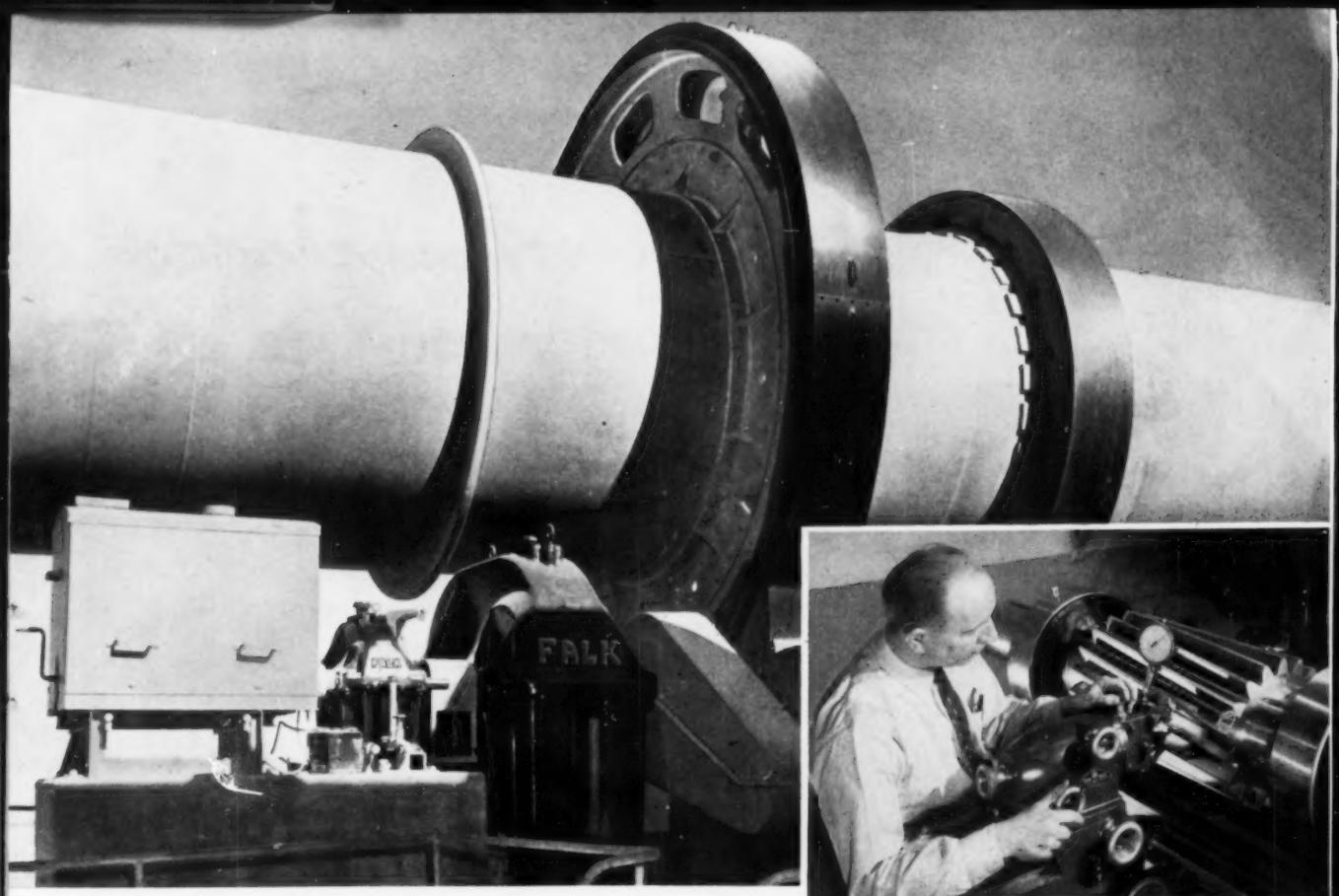
One of the three 8-ft. 6-in. by 30-ft. 6-in., 2-compartment finish grinding mills.

Finish Grinding Also alongside the storage area are the feed bins for the three finish-grinding mills. For each mill

(*Continued on page* 160)



The compact 1,100-hp. synchronous motors and gear reducers for the raw- and finish-mill drive are housed as shown here, adjacent to the mill room.



Quick Quiz on Gear Costs

—plus some money-saving answers!

Here are some questions and answers of major importance to mill and kiln operators and engineers who want to keep costs down:

Q. Are you losing production through "down time" caused by gear failures and frequent pinion replacements?

A. Falk Helical Gears and Pinions, correctly engineered, precision-hobbed and of highest efficiency, *keep operating* year-in-and-year-out.

Q. Do antiquated gears force you to use large, costly, slow-speed motors?

A. Falk Helical Gears provide a single-mesh, high reduction ratio drive which permits use of higher-speed motors resulting in savings in power bills and space.

Q. Is abrasion causing accelerated wear on your spur gears and shortening their life?

A. Falk Helical Gears are specially designed and precision-built to give maximum resistance against abrasive wear.

Q. Are gear teeth of outmoded design being taxed beyond their capacity?

A. In Falk Helical Gears, with full depth profiles, several teeth share the load at all times, assuring long service life.

Q. Is vibration, caused by inaccurate gearing, damaging associated equipment?

A. Falk Helical Gears operate so smoothly that vibration resulting from tooth contacts is eliminated.

When expanding or modernizing your mill or kiln facilities, you can effect substantial long-range savings by specifying "Helical Gears by Falk," the nation's pioneer and largest supplier of precision, helical gearing.

Consult any Falk Representative—also, write for
Engineering Report 6170, "Advantages of Helical Gearing"

THE FALK CORPORATION, 3001 W. CANAL ST., MILWAUKEE 1, WIS.

MANUFACTURING TECHNIQUES THAT BENEFIT GEAR USERS

The manufacture of Falk Helical Gears and Pinions involves many unique and interesting techniques in foundry, machine shop, laboratory, gear cutting and other departments—including inspection.

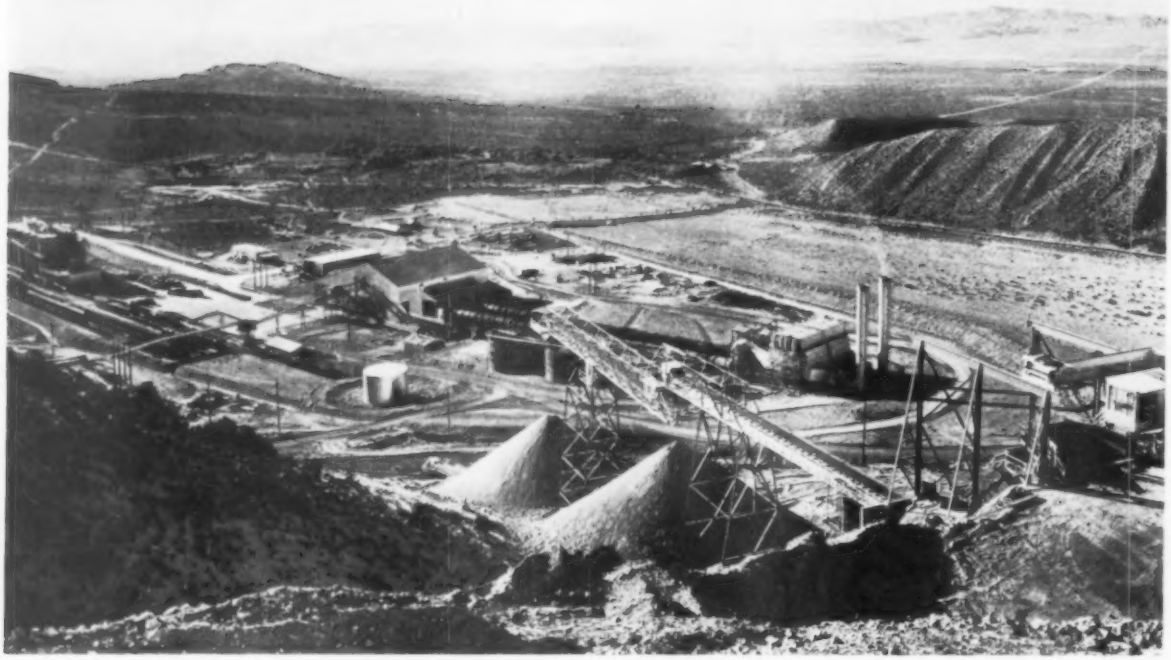
A typical example of the extreme thoroughness of Falk methods is shown in the small photograph above. In the Falk gear laboratory, the correctness of tooth spacing on a mill pinion is determined by measuring the normal base pitch. Readings are taken completely around the pinion. Tooth-to-tooth spacing is generally within limits of .0002″, and total accumulated spacing error averages only about .0005″. These values are a natural consequence of the inherent accuracy of the machines and procedures employed.

Such techniques as this assure the gear user that he is receiving the utmost in quality in every Falk product.

FALK

...a good name in industry

Permanente's



A general view of the new Cushenbury plant, seen from a point in the quarry. The primary crusher is at the right, with surge piles of cement and metallurgical stone beneath the 2-flight stacking conveyor.

ANOTHER ON THE SPOT REPORT

MARKING its first major entry into the southern California production and marketing area, Permanente Cement Company began producing portland cement at its new 2-kiln wet-process plant at Cushenbury, near Lucerne Valley, Calif., in April of this year.

The $13,000,000 facility has a designed capacity of 2,500,000 bbl. annually and will ultimately turn out a full line of standard and special-purpose cements.

Featuring automatic control to a high degree, the plant was designed, engineered, and constructed by Kaiser Engineers, Division of Henry J. Kaiser Company. Operations are straightline and uncluttered throughout, belt-conveyors being used almost entirely to transport raw materials and clinker from source to stockpile and mill. Planned to allow for future expansion to serve the needs of its territory, which continues to grow at an amazing rate, the plant is one of the most modern on this continent. Much credit is due its designers, who were able to build such a remarkably fine facility at a cost well below the national average. Most new plants erected in the last year or so have required a capital outlay of from $7 to $10 per bbl. of capacity. Cost of the Cushenbury plant was approximately $5.25 per bbl., as revealed by the company's latest financial report.

The plant has an initial labor force of about 175 and will have an annual payroll of $1,000,000. Situated at a 4,300-ft. elevation near the high southern rim of the Mojave Desert, it is the only industrial plant of any size within a radius of 30 miles.

The limestone deposit is being worked by Permanente under a 99-year lease from Kaiser Steel Corporation, which acquired it at a cost of $1,500,000 in 1955. Not only does the newly-opened quarry supply cement-making material, it also crushes and sizes metallurgical stone for delivery to Kaiser Steel's mill at Fontana, Calif. The Santa Fe Railway installed 29 miles of new track from its main line near Hesperia to Cushenbury to enable the company to ship out stone and cement. In addition, Permanente put into service a fleet of 34 new trucks and trailers to ship its product over the highways. Bulk-cement delivery units are Kenworth-Trailmobile combinations powered by 250-hp. Cumins diesel engines. Wide use of aluminum in this equipment permitted a gain of 23 bbl. payload per unit over all-steel truck-trailers of similar size.

The quarry requires little or no

New Cushenbury Plant

Features True Laboratory Control

By HARRY F. UTLEY

stripping, and plans call for benching it at 30-ft. levels, using a Joy rotary machine as the chief piece of drilling equipment; this drill puts down a 4-in. hole. Mining is definitely selective since analytically the stone requirements for cement and steel-mill flux differ widely. Eventually the haul to the primary crusher will average out about 2,000 ft.; and the big primary crusher, a 66- by 84-in. Birdsboro-Buchanan jaw machine, makes the initial reduction of all grades of stone, being set to break at about 7½ in. Quarry-to-crusher trucks are Euclid end-dumpers carrying 22 tons per trip.

From the crusher the stone travels along a 60-in. wide 2-flight straight-line belt-conveyor to build up two surge storage piles with a combined capacity of 150,000 tons. Controlled by the primary-crusher operator, discharge can be effected either at the head-pulley or by flop-gate at mid-point, the near pile being cement-grade stone and the far pile metallurgical-grade stone. The operator of the Bucyrus-Erie 110-B 5-cu. yd. electric quarry shovel, by blasts on an air-horn, lets the truck driver know which grade of stone is being loaded. The driver, in turn, raises a signal flag as he approaches the primary crusher to inform the crusher operator, who can then stack the product into its proper pile after it is crushed.

Both piles are in line over a conveyor reclaiming tunnel from which another belt conveys to the top of the screening and final-crushing tower.

The control board in the laboratory building, from which raw-feed ratios are regulated. A facing panel, the back of which is seen at the right, similarly controls clinker and gypsum proportioning on the finish side.

An electric shovel loading one of the 22-ton payload quarry trucks. The rotary drill is visible on the upper bench.

When metallurgical stone is being processed, a Robins scalping screen first diverts plus 7-in. rock to a Telsmith 20B gyratory crusher at ground level and is closed-circuited by return belt. A following pair of Robins double-deck screens makes 7- to 3½-in. product (open-hearth stone) and 3½- to ¾-in. (blast-furnace stone). The minus ¾-in. "spalls" are not usable in steel-making and are conveyor-stockpiled for use as cement raw-material. A long belt-conveyor delivers the metallurgical stone to car-loading bins for rail shipment to Fontana.

Processing of the limestone begins here at the 66- by 84-in. jaw crusher, set to break at about 7½ in.

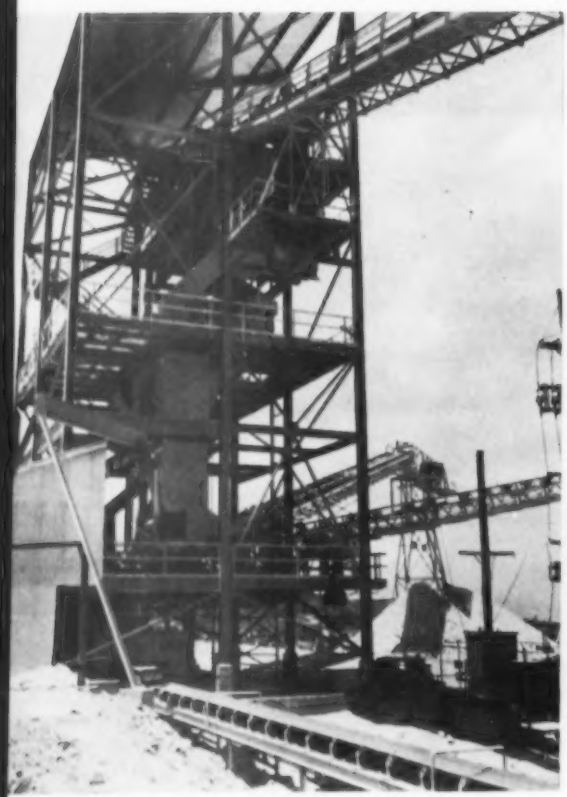
The same equipment is used to size the limestone going exclusively to the new cement plant, except that final reduction to minus ¾ in. is made by a Pennsylvania CB15-50 Impactor, a common return belt conveyor serving both it and the gyratory in closing the circuit with the screens overhead.

The two stockpiles of minus ¾-in. stone (high calcium—low silica in the case of the metallurgical-grade spalls, and lower calcium - higher silica cement stone) are built up over another reclaiming tunnel for conveyor delivery to the grinding mills at the plant. Other mix components are delivered to the mill by way of a track-and-truck hopper and belt-conveyor system. These include high-grade clays from Ione, Calif.; a so-called plant clay obtained from a nearby dry lake; and roasted iron pyrites, silica rock, and retarder gypsum. Conveyors are equipped at strategic points with Fairbanks Morse scales to tally tonnages enroute. Apron feeders regulate the flow onto the belts in the various reclaiming tunnels. All cement raw materials are tripped from the belts into a row of steel feed bins in the mill building, a structure equivalent in height to an 8-story building and 160 by 234 ft. in ground area.

Probably the most interesting feature of the Cushenbury flow-sheet involves the precise proportioning of the raw materials, as well as of the clinker and gypsum on the finish side. Not only is this done automatically by weight, but regulation of the feed rate for each component is controlled electrically solely from the plant laboratory, located some distance away in a separate building. It is possible for the mill operator to increase or decrease the total volume of feed from within the mill building, but impossible to vary the proportions, thus insuring foolproof, true laboratory control.

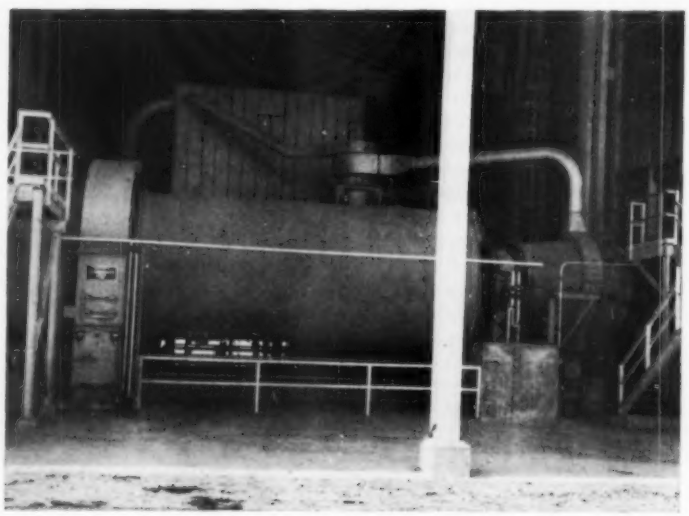
From its separate feed bin, each raw ingredient, (1) cement-grade stone; (2) high-calcium spalls; (3) clays; (4) silica; and (5) iron pyrites, is fed and weighed in predetermined quantities by an individual Jeffrey-Waytrol feeder. The beam scale and its setting are visible behind a glass door, but the door is padlocked to discourage tampering.

Off in the quality-control room in the lab building are the electronic panels which record and serve to



Left: The screening-and-crushing tower, where stone, arriving by conveyor at the top, is sized and surge-piled for use in the plant, or for shipment to the Fontana steel mill.

Below: The three identical grinding mills are arranged in a row in the mill building. The one shown here is on finish grind and is closed-circuited with the air-separator, followed by the bag-type dust collector.



regulate the feed ratio. The panel board includes Leeds & Northrup Speedomax recorders, totalizers, and the Jeffrey electronic controllers. A buzzer sounds to warn of any discrepancies, and red and green lights flash visual evidence of possible variances; and the laboratory technicians make adjustments accordingly right at the panel. Clinker, gypsum, and additives are similarly proportioned by this remote-control method.

Three 9½- by 36-ft. F. L. Smidth compartment mills handle the grinding, one of each being in regular service for raw and finish grinding, the third being in "swing," capable of grinding either wet raw materials or dry clinker. The mills are arranged in a row with space for future additions; they are Symetro driven and employ slide-shoe bearings. The three Westinghouse 1,500-hp. synchronous drive motors are installed in a separate pressurized dust-free room adjoining the mill-room proper, drive shafts passing through sealed ports in the wall.

Closed-circuit wet grinding is used to reduce the slurry to proper fineness, a bank of four Robins Vibrex single-deck screens retaining oversize on the No. 40 by No. 50 mesh Toncap decks, and these tails return to the mill.

Another most interesting feature in the slurry preparation is the planned installation at an early date of a density controller which will automatically regulate pulp consistency of the slurry by nuclear means. The device will sense radio-actively the density of the screen underflow directly through the slurry pipline by gamma rays and, by automatic impulse, will increase or decrease the feed water entering the mill, should any variation from the desired density develop.

Since the raw mix is carefully and accurately proportioned before grinding, there is little cause for correction or further blending. The slurry is pumped directly into any of three 65-ft. diameter reinforced-concrete storage tanks, air agitation and Dorr-Oliver rakes keeping the particles in suspension before the mix is fed to the kilns. Slurry is transferred into and out of the tanks by Wilfley pumps.

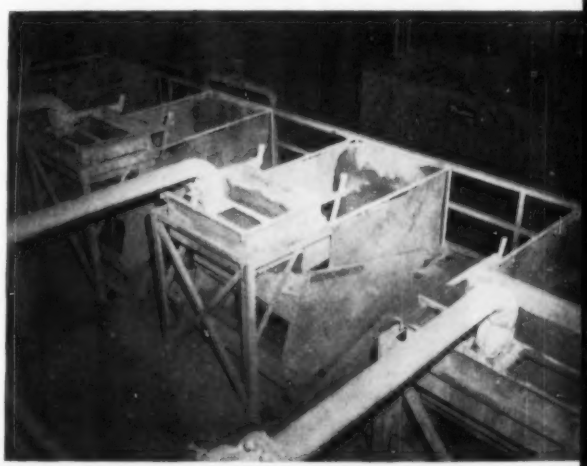
Each of the two Smidth all-welded kilns is 12 ft. in diameter and 450 ft. in length, a size which Permanente has adopted as standard in its existing and future plants. They slope the usual ½ in. per foot of length and are driven in the range of 60 to 70 r.p.h. by Westinghouse Type SK d.-c. 200-hp. motors through Western Gear D62 reduction boxes. Allis-Chalmers gasoline engines can provide standby power. The 7 tires on each kiln turn on water-cooled trunnions.

Each kiln has a 57-ft. 8-in. chain section, followed by refractory lining as follows: 37 ft. of 6-in. acid-flint brick; 196 ft. of 6-in. 42 percent alumina; 54 ft. of 9-in. 42 percent alumina; 30 ft of 70 percent alumina; 51 ft. of 9-in. Kaiser chrome-periclase in the hot zone; and 15 ft. of 70 percent alumina to the firing ends.

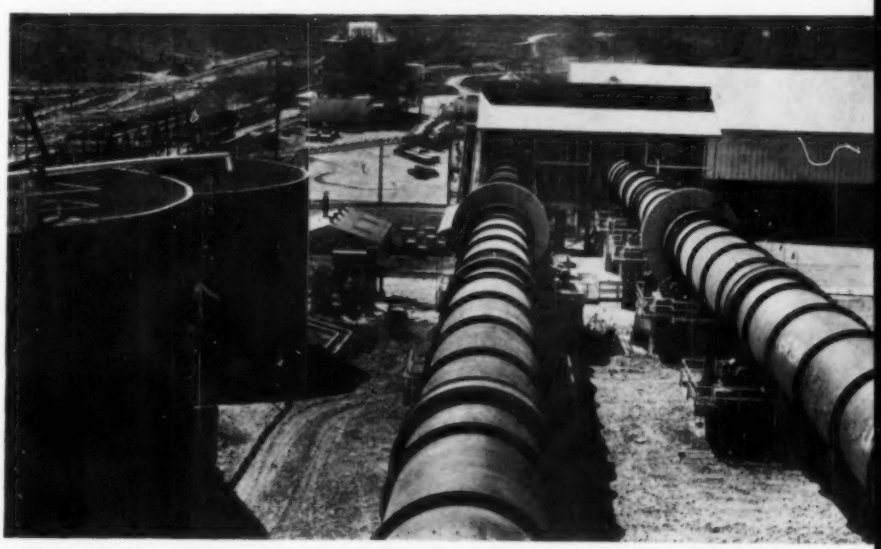
Natural gas is the normal fuel, with oil as standby, the Coen combination burners handling either type of fuel.

Burning and related functions are observed, recorded, and regulated from a centralized control board islanded on the spacious burning floor common to the two kilns. Planned and installed by Swanson Engineering & Mfg. Company, the board mounts an array of indicators, signal lights, and switches which give the operator a control almost as precise as that achieved in grinding. Dust density, observed by electric-eye in the stacks, can be read. Variables such as fuel and gas flow, back- and front-end temperatures, and draft, are metered and recorded. A kiln-revolution counter and indicators showing slurry feed in relation to kiln speed, are included, both in synchronization. Ammeters and circuit breakers for the various drive motors are grouped to the left and right of the recorders on the board.

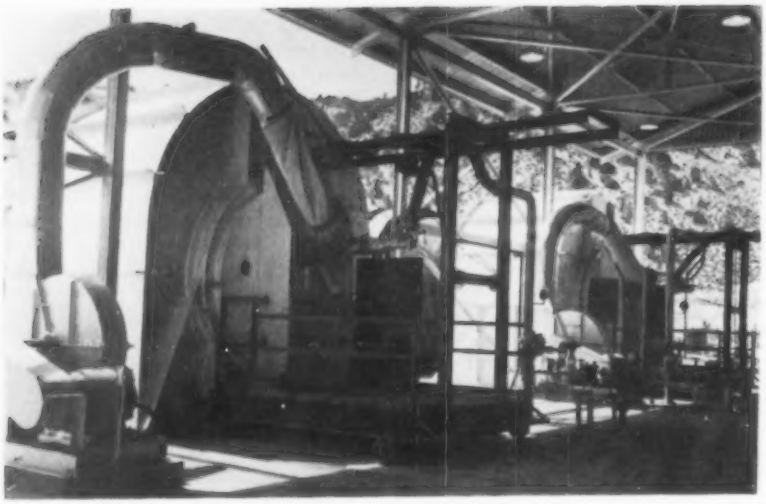
The kilns are exhausted by fan-induced draft to a Research-Cottrell 4-unit electrical precipitator and into the atmosphere by way of two 125-ft. steel stacks. The precipitator contains a combination of rod and expanded-mesh grid electrodes



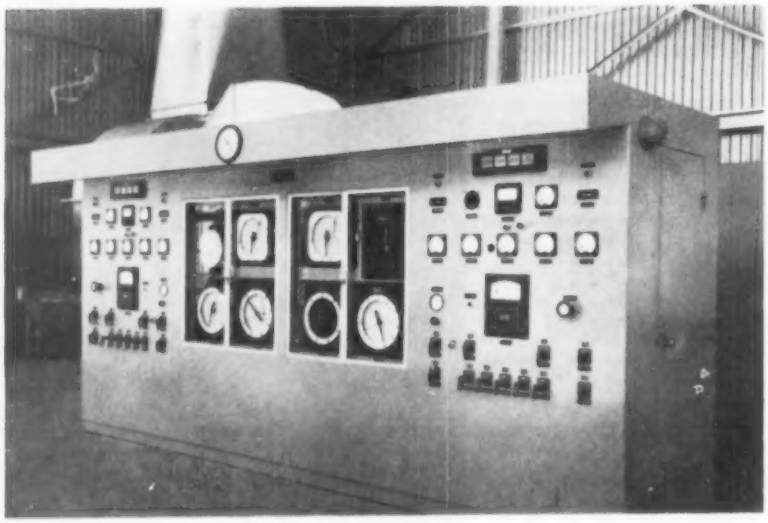
Right: These four wet screens are in closed circuit with the raw-grinding mill. Retained oversize returns to the mill; throughs are sent to the slurry-storage tanks.



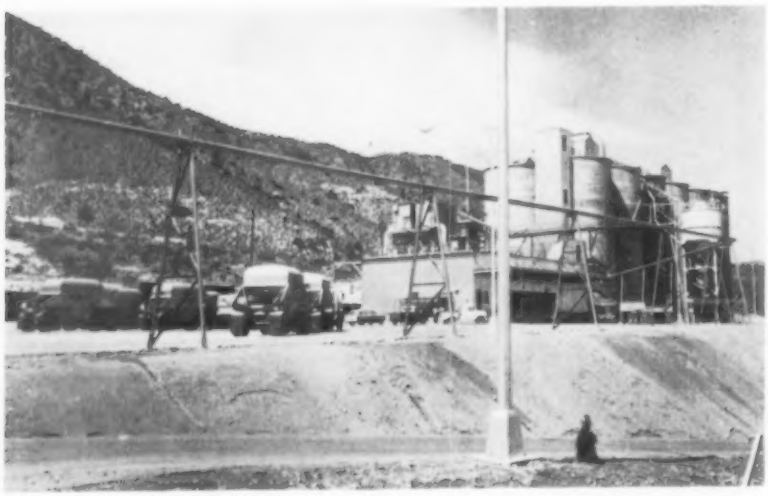
Below: A closeup view of the two kilns, looking toward the firing ends. At the left are two of the three slurry tanks. The packhouse and silos are in the distance.



The firing ends of the two 12- by 450-ft. rotary kilns.



On this instrument and control board burning functions are observed, recorded, and regulated.



The packhouse and finished-cement storage silos. In the foreground is the elevated pipeline through which the cement is pumped from the mill to the silos.

and employs magnetic-impulse automatic rappers. Collected dust is gathered and returned to the kilns by screw conveyors, bucket elevator, and Fuller-Huron Airslides. All dust is blended into the feed circuit with the oncoming slurry. (At Permanente's 6-kiln plant near Santa Clara, collected dust is in sufficient volume so that one kiln is on this type of feed alone.)

Clinker from each kiln is cooled by a 8- by 44-ft. Fuller inclined-grate cooler, equipped with swing-hammer breakers at the discharge end, from which it is sent to storage by a parallel belt-conveyor system. New York Blower power-limiting fans supply quenching and cooling air, and any excess not used as secondary air of combustion in the kilns is exhausted by fans of the same make to Buell collectors. Recovered clinker dust returns to the carry-away conveyors.

The storage hall for clinker and gypsum adjoins the finish-grind side of the mill building; and the clinker drops by tripper, from the conveyors into storage, or directly into concrete feed bins integral with the inner wall. A P & H bridge crane of 70-ft. span handles a 2-cu. yd. grab bucket for loading and distributing the clinker and gypsum. Clinker storage capacity is in the neighborhood of 150,000 bbl.

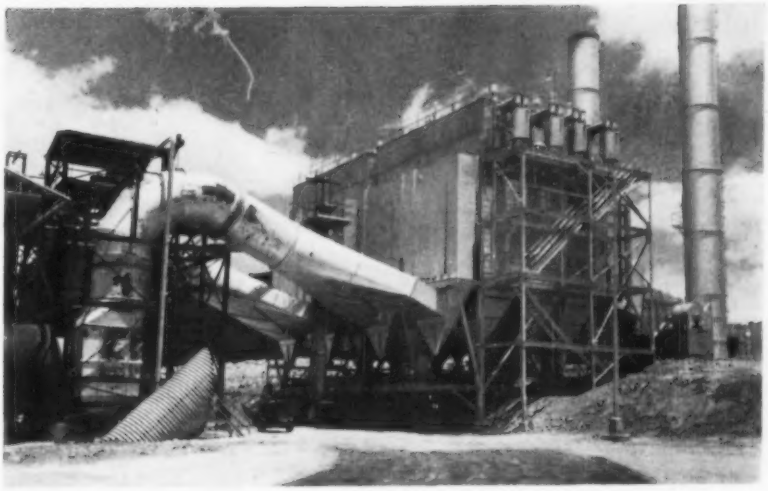
The Waytrol proportioning system, remote-controlled from the laboratory, has been previously described, the finish mill being in closed-circuit with a pair of 16-ft. Sturtevant air-separators. Finished cement is conveyed by Fuller-Kinyon pumps through elevated pipelines for a distance of 960 ft. to the silos.

The 12 finished-cement silos, 75 ft. high, have, along with the star-bin sections, a total storage capacity of 192,000 bbl. An adjoining packing building houses two 4-spout St. Regis packers for sacking a portion of the product. Served by the railway on one side and a roadway on the other, the bulk or sacked cement can be loaded either way with equal facility. Bulk loading is a comparatively dust-free operation, transfer points being under suction to the dust arrestors. Truck-trailer shipments are weighed out by a 60-ft. Fairbanks Morse platform scale; rail shipments are weighed by a similar 4-section railroad-type scale.

Pangborn bag-type collectors are installed on the packhouse and in the mill building. Airslide conveyors are widely used through the plant—in the mill, the finished-cement end, at the precipitator, and at the feed end of the kilns.

A Manning-Maxwell-Moore 10-ton hook crane spans the width of the mill building, and a 15-ton Moffett crane is mounted over the primary-crusher opening to facilitate handling heavy parts, etc.

The 22,000 cu. yd. of concrete required to construct the plant was supplied by the Service Rock Company of Riverside, Calif. This concern set up a temporary automatic batch plant on the Cushenbury site to prepare and deliver by truck-mixer wherever the concrete was needed. The 40,000 tons of washed-and-screened aggregate for the concrete came from Service Rock's plant near Riverside and was hauled 67 miles to Cushenbury by truck.



Above: Dust housings and ducts lead from the kilns to the 4-unit electrical precipitator. The induced-draft fan may be seen at the base of the stack.

Left: A crawler-mounted loader cleaning up around the raw storage pile of minus ¾-in. stone.

California Electric Power Company brought in a 115,500-v. highline to the plant to supply power for plant operation. Voltage is stepped down by a Westinghouse 10,000-kw. transformer.

Works Manager James G. Hansen has his office in a modern structure near the plant entrance. Mr. Hansen formerly managed the Eagle Mountain iron-ore mine of Kaiser Steel Corporation. Arthur Rich, plant superintendent, whose office is located in the laboratory building, is a veteran of 25 years' service with the Kaiser enterprises, having formerly been based at the Permanente cement plant and the Kaiser Aluminum & Chemical dolomite and lime operations near Salinas, Calif.

The plant laboratory has a full complement of testing and analytical equipment and is under the supervision of Richard Sharp, chief chemist Ed Conners is quarry and crushing-plant superintendent; and Per Bostrup supervises plant maintenance.

C. W. (Pete) McKinley is sales manager of a newly-created sales division embracing southern California, western Nevada, and northern Arizona. Division headquarters have been established in downtown Los Angeles.

The new plant was officially dedicated on May 16, 1957. Ceremonies were attended by nearly 1,100 industry, business, political, and labor dignitaries who were brought to the plant by a special El Capitan train over the Santa Fe and by chartered planes from Los Angeles.

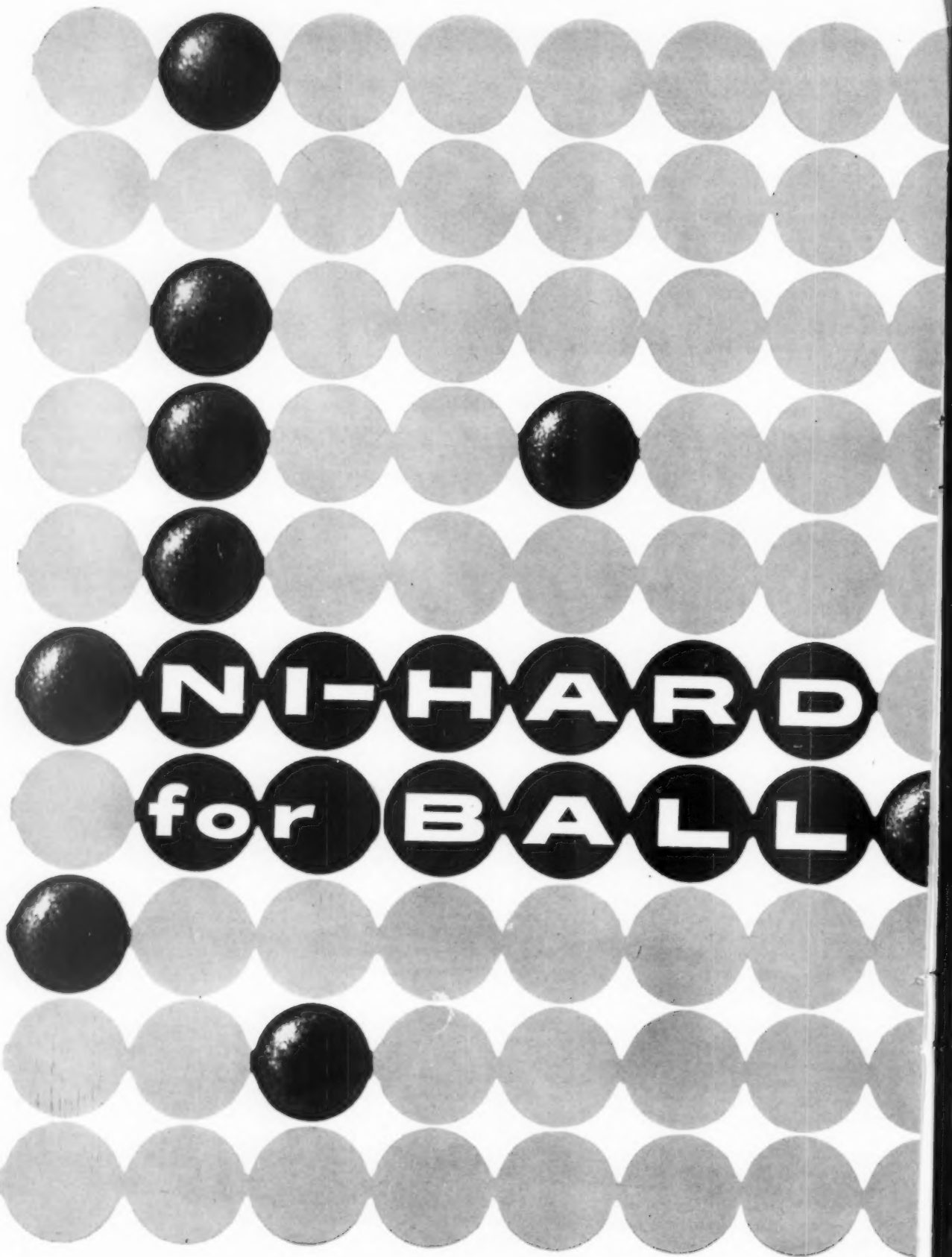
The new Cushenbury facility is a part of a multimillion-dollar expansion program which the Permanente management touched off in 1955. It is designed to increase the company's cement-producing capacity by nearly 60 percent. Addition of another kiln, the sixth, at the parent plant brought its annual capacity to 8,500,000 bbl., giving the firm a present total potential of 11,000,000 bbl. The next planned expansion will be a third plant at Scholle, N. M., where the company owns 2,200 acres of high-grade limestone deposits. Engineering for the New Mexico plant is now in progress.

Permanente's marketing area has grown as its production has increased. Since 1940, when its market covered only a portion of northern California, the company has now broadened its scope to include all of California, Nevada, Arizona, Oregon, Washington, British Columbia, Alaska, Hawaii, and other Pacific islands, Mexico, Central and South America, and even South Asia.

Distribution plants at Permanente and Redwood City, Calif., Portland, Oreg., Seattle and Pasco, Wash., Anchorage, and Fairbanks, Alaska, Honolulu, and Midway Island, and an ocean-shipping terminal at Redwood City all provide silo storage for 1,000,000 bbl. of cement.

The Permanente Steamship Company, a subsidiary, operates two self-unloading bulk carriers, S. S. *Permanente Silverbow* and S. S. *Permanente Cement*, with cargo capacities of 58,000 and 40,000 bbl., respectively, to serve the Portland, Seattle, and Honolulu distributing plants. The Pasco facility is supplied from the silos in Portland by steel barges towed up the Columbia River. The river-barge delivery system was first used to supply cement for the building of several large dam projects in the Columbia River basin. Sea-going

(*Continued on page* 155)


NI-HARD
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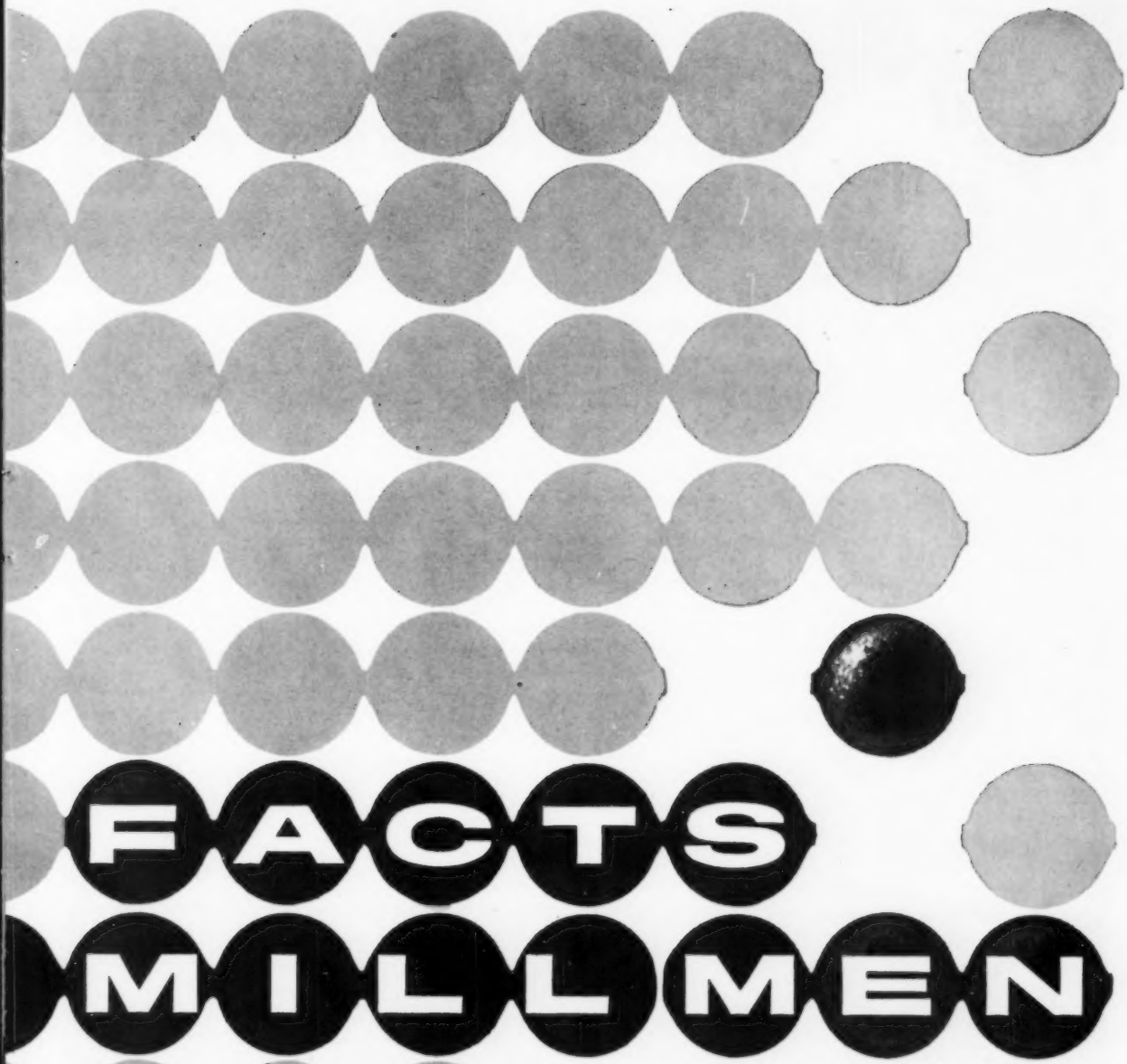


FACTS MILLMEN

Records of six cement companies show Ni-Hard* nickel-alloyed white cast iron in clinker grinding service cuts ball "make up" 65 to 80% over the best hardened steel.

For a list of authorized producers, write to

The International Nickel Company, Inc.
67 Wall Street *Registered trademark New York 5, N. Y.

INCO TRADE MARK

Ni-Hard cast iron vs. hardened forged steel in clinker grinding

Plant**	Test Duration	Ni-Hard Superiority
"A"	1 year	4.58/1
"B"	1 year	5.4/1
"C"	2 years	5/1
"D"	3½ years	3/1
"E"	2 years	3/1
"F"	Reg. Production	No discoloration of white clinker

** Plant names on request.

INCO

Raw Mix Drying And Grinding Systems

By J. R. TONRY
Process Engineer
Portland Cement Association, Chicago

PART I

THE combination of two operations, drying and grinding, in the preparation of dry raw mix is a relatively new process in the cement industry. Drying is accomplished by means of hot air forced through air separators, or by air-swept mills. Long established practice has been to use separate dryers and grinding units.

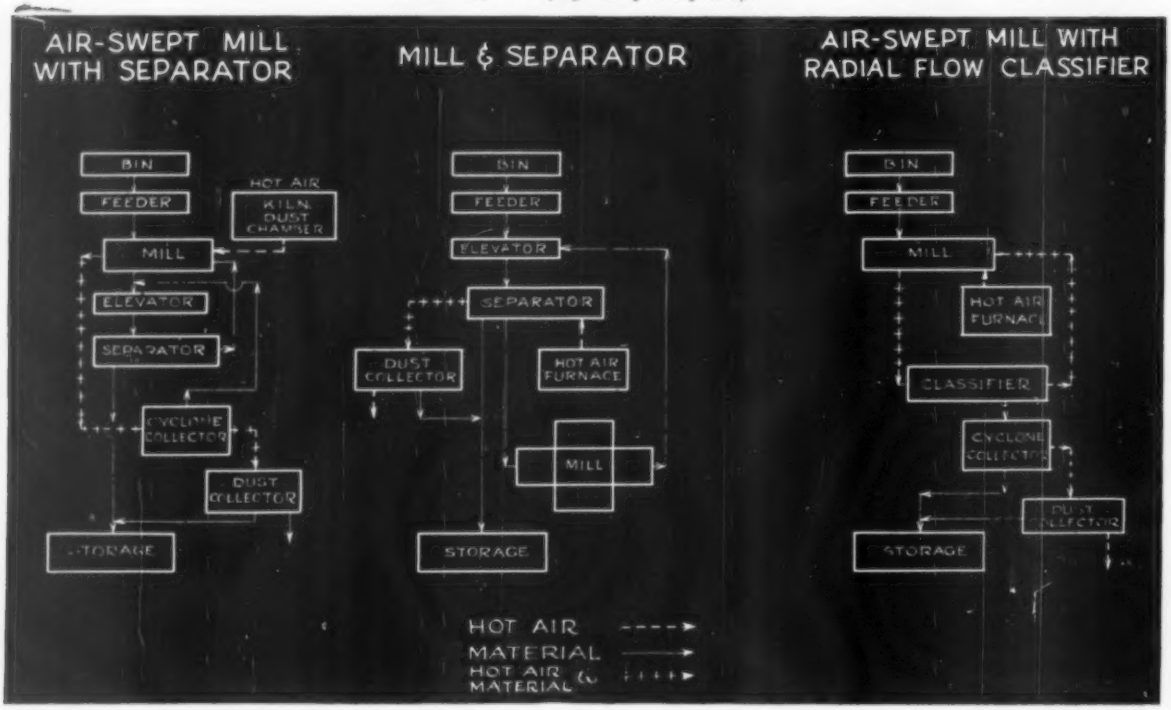
Information accumulated from visits to nine plants (May through November, 1955), has been studied and principal items of interest are discussed separately.

The first plant reported to use the process of combined drying and grinding in raw mix preparation started in 1937, using hot air in the separator as a drying medium. The system consisted of feeders, a super capacity elevator, a ball and race pulverizer, an air separator, an oil-fired furnace and accessory conveyors and a pneumatic pump.

In the preparation of raw mix for dry-process plants, some provision must be made to reduce or eliminate the moisture present in the raw materials. For many years the practice has been to use rotary driers, generally coal-fired, but possibly using oil or gas, to do this drying. The feed passed through a drying cycle of preheating, evaporation, and superheating as it traveled through the dryer. In contrast, the process of combined drying and grinding could be called "instantaneous drying" because the moisture is evaporated very rapidly by exposure of the high-surface area of raw material to heated air.

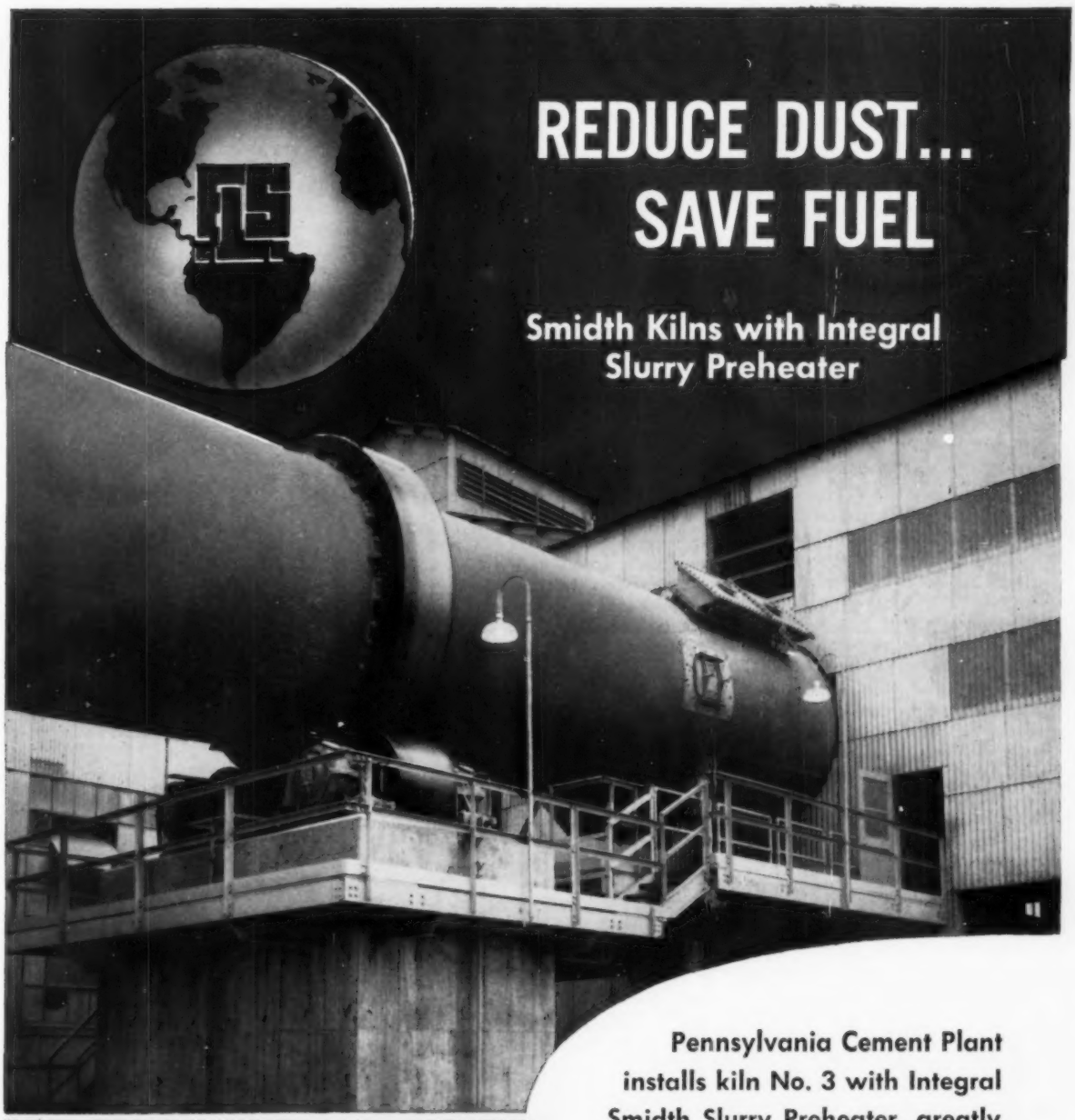
Typical arrangements for combined drying and grinding are shown in Figure 1. Materials-handling equipment is not so conspicuous in these systems, and some conveyors are not indicated. The layouts have been divided into three general systems: (1) air-swept mill with sep-

Fig. 1—Typical drying and grinding setup.



REDUCE DUST... SAVE FUEL

Smidth Kilns with Integral Slurry Preheater



Pennsylvania Cement Plant installs kiln No. 3 with Integral Smidth Slurry Preheater, greatly reducing dust loss and fuel consumption.

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arator, (2) mill and separator, and (3) air-swept mill with radial classifier.

Table I is made up of general statistics for the various installations of combined drying and grinding. Moisture content of the feed and product is given, along with fineness, in addition to production rates, horsepower, dust collector bag materials, bag life, fuel, raw materials, and control points. The last set of figures in the table (1905 plant) were included for purposes of comparison. The main difference, aside from the drying technique, between the separate system and the combined system are larger mills, less materials handling, and less auxiliary equipment required, such as electrical, cyclone, and bag-type dust collectors.

The general systems can be divided into only two methods of drying in the combined operation: (a) by means of hot air introduced into an air separator, or (b) by a hot air stream which sweeps a tube mill.

The grinding is accomplished in two types of mills: (a) ball mills, or (b) ball and race mills.

In each plant the control point for regulation of production was an interesting feature. In all cases, the classifier was set to produce the desired fineness, and the feed was regulated to some set loading point on the mill, the elevator or the classifier.

Adequate insulation of the system is an important item in order to avoid condensation of water vapor from the hot drying gases. Materials used include rock wool, fiber glass, magnesia blocks, and coverings of metal or insulating cement.

A feature of these systems is the operation of many units with only two or three men per shift. This means a higher production rate per man-hour than was obtained with the separate drying and grinding units.

The hot air furnace is important for supplying an adequate amount of heat to meet all operating conditions. One plant went from a 6,000,000 B.t.u. rating to a 12,000,000 B.t.u. rating on the furnace when another unit was added.

PRODUCTION CONTROL METHODS

Control of production in these systems is accomplished in four different ways: elevator loading, mill sound, mill power, and separator loading. Practice in each of the eight plants is described below under its proper classification. Four plants use the elevator loading system, two use mill sound, one uses mill power, and one uses separator loading.

Elevator Loading Any one of four methods may be used to control the operation by the elevator loading. Actual practices are as follows:

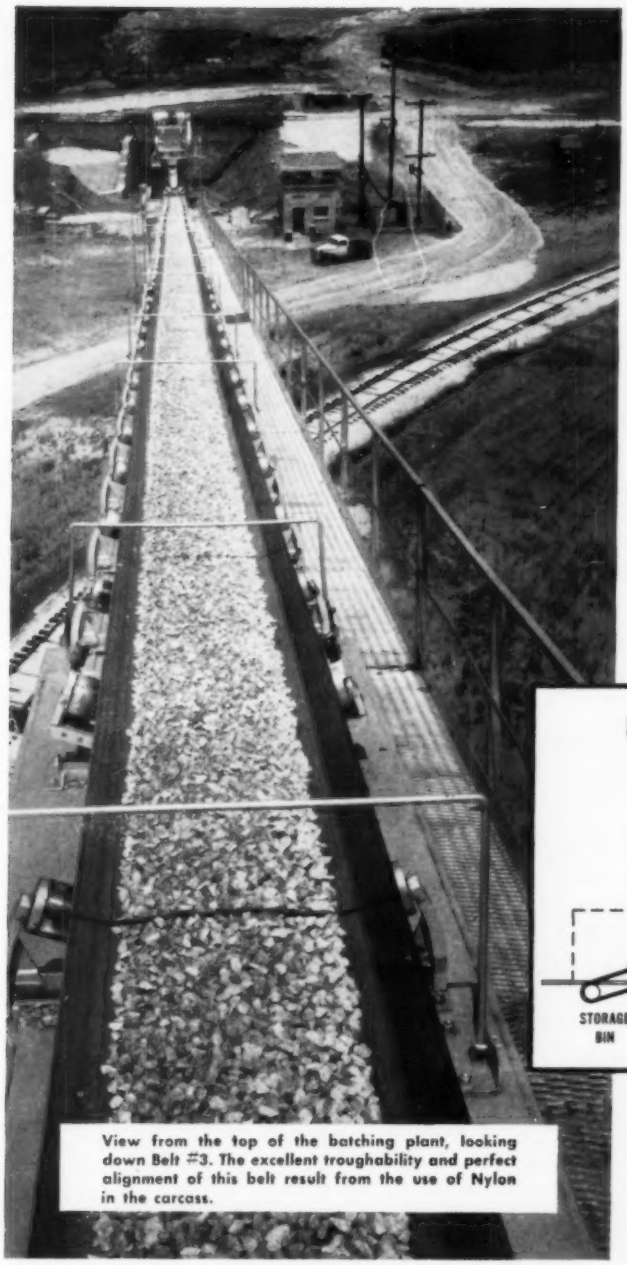
(A) The feeders regulating the raw materials to the mill are equipped with two-speed motors, full and half. When the elevator motor load deviates from 60 amperes, the feeders automatically change speed. For example, if the elevator motor load gets too heavy, the feeder will automatically go to half speed, and then after a certain interval to full speed, according to the time cycle. If the system is still overloaded, half speed is repeated; and the time device repeats its operation. When the motor load becomes light, the feeders switch automatically to run continually at high speed. To get the best operation, the feeders are set for a little over what the system is expected to take, taking advantage of any increase in grindability and keeping the system in a more uniformly loaded condition.

(B) The operator watches the elevator loading as shown by an ammeter on the panel board. When the ammeter reading passes a marked point, he shuts off all new feed. In case more load is required, a tester from the laboratory adjusts the feeders to give a larger tonnage.

(C) The operator watches the ammeter on the feed elevator motor circuit for production control. He is expected to hold this reading between 38 and 40 amps. In case the load goes outside this range, he speeds up or slows down the stone feeder belt. Clay and shale are not changed by the operator. This is

TABLE I—COMBINED DRYING AND GRINDING
BASIS—ONE COMPLETE UNIT
(Plant I uses separate Drying and Grinding)

PLANT INSTALLED	GRINDING MILL	CLASSIFIER SIZE	RATE TONS PER HOUR	FEED		PRODUCT		HORSEPOWER INSTALLED		DUST COLLECTOR			CONTROL POINT	FUEL	RAW MATERIALS
				% MOISTURE	SCREEN SIZE INCHES	FINENESS % PASSING #200	% MOISTURE	TOTAL	HP. PER TON	TYPE	NO. BAGS MATERIAL	BAG LIFE			
A 1938	Ball & Race	16'	35	1 1/2-3	3/4 Square	90	0.1-0.5	854	24.4	Bag	200 Nylon	7	Elevator Load	No. 4 Oil	Limestone Shale
B 1952	Air-Swept 9'6"x26'	16'	30	1-10	3/4 Slot	94	0.5-0.7	801	26.7	Bag	400 Wool	6 Mo.	Mill Sound	None	Limestone Shale
C 1949	Air-Swept 10'x22'	9'-6" Radial Flow	36	0-1	3/4 Slot	89-90	0.1-0.0	1295	36.0	Bag	390 Nylon	18 Mo.	Mill Power	Coal Stoker	Limestone Shale
D 1954	Ball Mill 10'8"x16'	16'	67	2-3 1/2	5/8 Square	87-88	0.3-0.5	1254	18.8	Bag	408 Cotton	6 Mo.	Elevator Load	Gas or Oil	Limestone Cement Rock Iron Ore
E 1951	Ball Mill 9'6"x15'	16'	36	5-8	3/4 Square	92-94	0.0-1.0	1216	33.8	Bag	546 Cotton	5 Mo.	Separator Load	Gas	Limestone Clay Iron Ore
F 1948	Ball & Race	16'	36	1-5	3/4 Square	92-93	--	754	20.9	Bag	504 Orlon	18 Mo.	Elevator Load	Coal Stoker	Limestone Shale Clay
G 1954	Ball Mill 10'6"x15'	16'	52	3-5	5/8 Slot	89-91	0.2-0.3	1402	27.0	Cyclone Bag	432 Orlon	18 Mo. or more	Mill Sound Device	No. 5 Oil	Cement Rock Limestone Sandstone Iron Slag
H 1951	Ball & Race	16'	36	3-7	1/2 Slot	88-92	0.2-0.8	855	23.7	Cyclone Bag	- 40 Wool felt	3 Mo.	Elevator Load	Coal Stoker	Limestone Clay Iron Ore
I 1905	Roller Mill Tube Mills	16'	116	1 1/2-3	--	88-90	--	3003	25.9	Cyclone Bag	- 216 350 546 Orlon	24 Mo.	Mill Load	Coal Stoker	Limestone Shale



View from the top of the batching plant, looking down Belt #3. The excellent troughability and perfect alignment of this belt result from the use of Nylon in the carcass.

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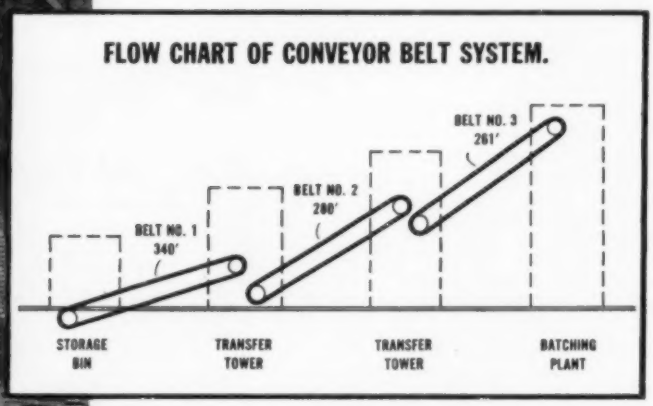

"This is the largest concrete plant* of its type in the world," says the plant's manager. "In aiming to turn out the best concrete at the lowest possible cost we require a highly mechanized operation."

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TABLE II—BALL MILLS—GENERAL DATA

MILL	R.P.M.	BALL CHARGE	BALL SIZES BY WEIGHT (PER CENT)						BALL LOSS
			3"	2½"	2"	1½"	1¼"	1"	
Air-Swept 9' 6"x26'	17.6	51,000 lb.	30	30	--	40	--	--	0.133 lb/ton
Air-Swept 10' 8"x16'	19.2	133,000 lb.	15	--	59	--	26	--	0.111 lb/ton
Ball Mill 10' 6"x16'	18.2	130,000 lb.	25	25	25	25	--	--	?
Ball Mill 9' 6"x15'	19.2	75,000 lb.	38	34	--	11	17	--	?
Ball Mill 10' 6"x15'	18.2	135,000 lb.	--	11	22	26	30	11	0.093 lb/ton

done by laboratory men, as indicated by control tests. The loading control point is closely watched as an increase in wet material could cause an overload and plug-up.

(D) The miller watches an ammeter on the elevator drive motor circuit and tries to keep it between 35 and 38 amps. When it goes outside these limits, he shuts off all feed or adds more feed as required.

Mill Sound (A) The loading of the system is regulated by the sound level in the mill, as detected by the mill operator. He regulates a variable-speed control on the feeders as needed. Consideration is being given to installing a sound device for automatic control.

(B) Loading of the system is automatically regulated by the sound level in the mill. A sonic device is mounted close to the shell of the mill and is protected against dust by a cloth cover. Speed of the feed belts is regulated to hold a set noise level. The critical part of this type of control is establishing the proper level to be maintained, and the device must be closely checked.

Mill Power Feed is automatically controlled on the basis of kw. usage of the mill motor. A recording and indicating controller is mounted on the panel to regulate and keep a continuous record of the operation. Feed changes are accomplished by varying the speed of the feed belts—fast, slow, or stop. The slow speed is ⅔ of the fast speed. A time-delay switch in the circuit prevents too frequent changes in feed. Actual feeder belt speeds are 30 f.p.m. on fast and 20 f.p.m. on slow.

Separator Loading In operating the system an operator manually controls the feed belts and watches ammeters on the elevator and air separator motor circuits. He keeps the ammeter reading between 125 and 135 amperes. As a check on the operation, a recording ammeter is connected into the elevator motor circuit.

DEW POINT AND INSULATION

Dew point is a factor to be considered in these drying systems. By definition, this is the temperature at which a given mixture of air and water vapor is saturated with water vapor, so-called because, on cooling, condensation begins at this point.

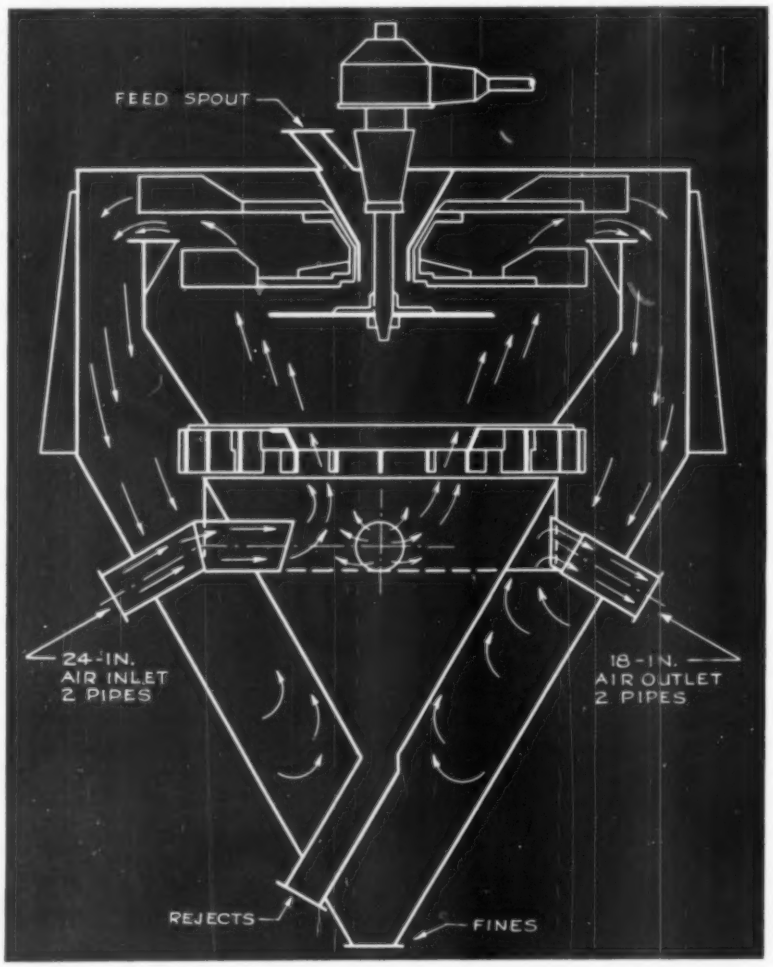
When wet materials are dried, enough heat must be supplied to insure that exit temperatures are above the dew point. Moisture-carrying capacity of air varies with temperature, and when the water content of the feed changes, the exit temperature should be maintained by adjusting the heat supplied to the system.

Heat losses in uninsulated dust collectors and ducts are enough to bring about condensation at normal temperatures. For that reason adequate insulation of the system is of prime importance.

One instance was noted where use of atmospheric air in dust collection blow rings caused condensation in the tubes of the dust collector. In some plants insulation was omitted on start-up, and holes had to be cut in the dust collector to let the water run out. The materials used on all ducts, separators and dust collectors are as follows: 3-in. asbestos, 2-in. fiber glass, 1-in. to 2-in. magnesia. For

(*Continued on page* 105)

Fig. 2—Air separator used for air drying.



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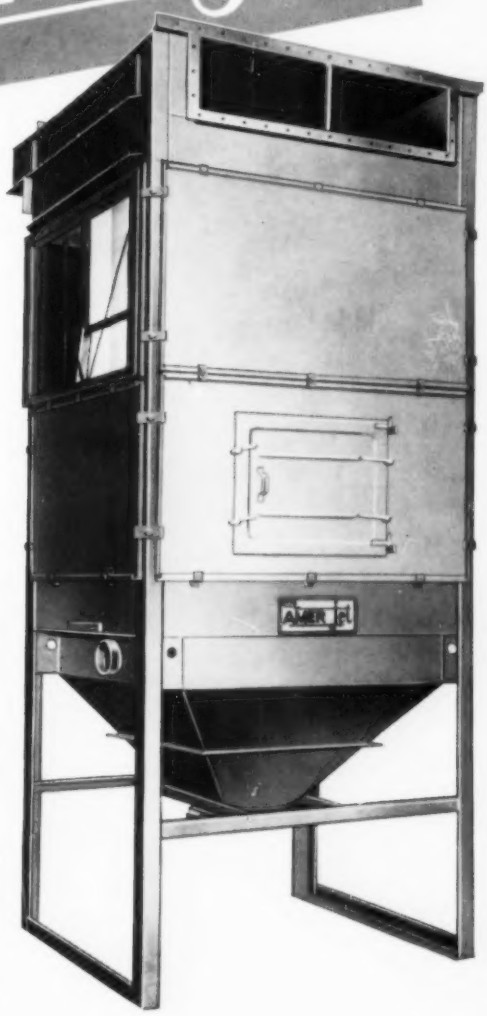

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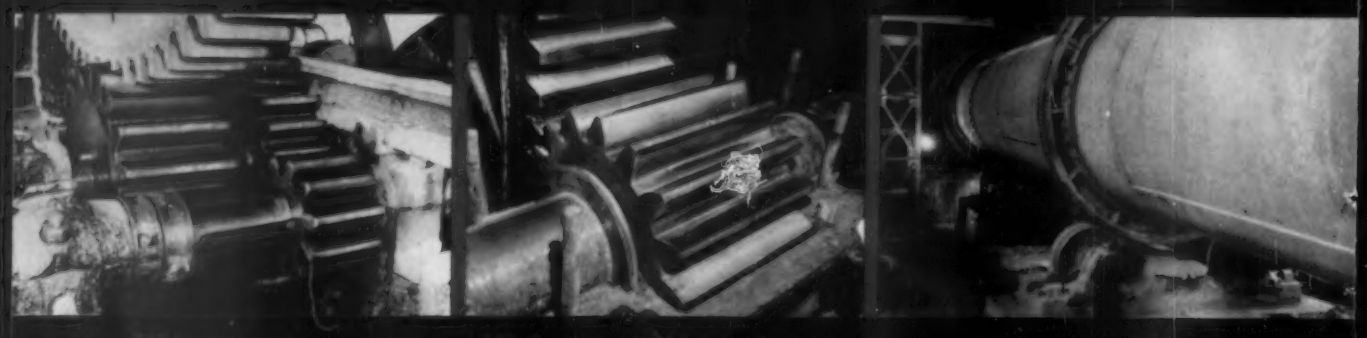

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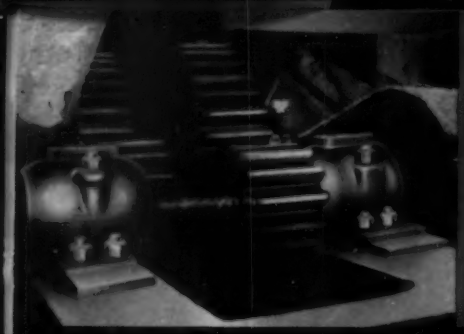

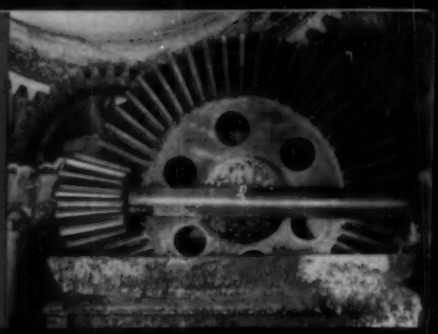

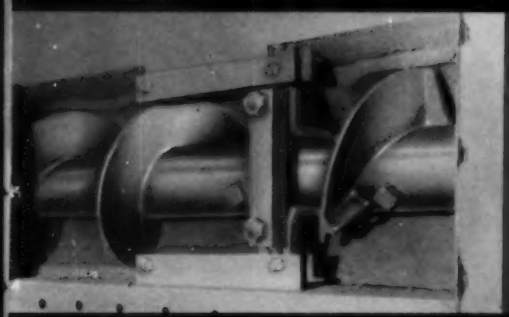

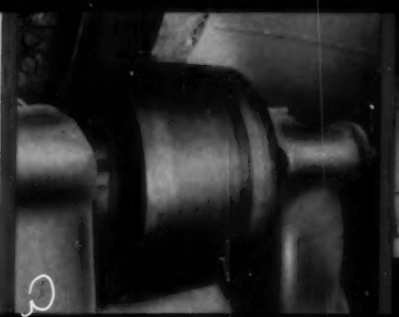

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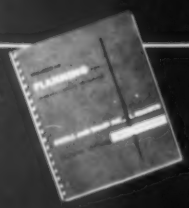

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Raw Mix Drying

(*From page* 100)

furnace ducts, common practice is to use 4½-in. refractory and castable linings.

DUST COLLECTORS

Interesting features of dust collectors are the bag materials, and the double system, in which a high percentage of the dust load is scalped off ahead of the cloth collector.

Many plants have used cotton, wool, orlon, or nylon fabrics for dust collector bags. Where orlon and nylon are being used, relatively good bag life is experienced. In one particular instance, troubles with bags vanished when a change was made from wool to nylon.

Where the scalping type of collector is used ahead of the cloth collectors, good results were reported. Part of the dust load is removed at this point by the mechanical collectors, making the work of the bag-type collectors much lighter. Several plants use cyclones ahead of dust collectors, and one has the scalping collector plus dual bag-type units.

Temperature of hot gases entering the dust collector is an important point, to avoid condensation and damage to the bags. Plant practice for control is as follows:

150 deg. F. ahead of collector
180 deg. F. ahead of collector
185 deg. F. ahead of collector
170 deg. F. ahead of collector
180-200 deg. F. ahead of collector
180-200 deg. F. exit side of collector
180-190 deg. F. ahead of collector.

Mills and Ball Charge The ball mill installations show variations in ball charges, as shown in Table II. Replacement of these balls is generally carried on in an orderly manner, and one plant found production dropping off when only large balls were used. A very interesting practice is that of screening representative samples of the ball charge to determine the proper sizes needed for replacement. Ball recharging practices for various plants are shown below.

As originally started, the mill was charged with 1-, 1½-, and 2½-in. balls and was changed to improve operation for higher capacity. Data on balls are as follows:

	Start	Later
3 -in.	..	30%
2½-in.	30%	30%
1½-in.	30%	40%
1 -in.	40%	..
	67,000 lb.	51,000 lb.

To make up for ball wear, the present loading factor is 4 lb. per mill-hour. These balls are added by opening the mill doors. Early in the operation ball additions were made of large size only, and grinding efficiency dropped off. Then experiments were started on changing the ball sizes, with the result that the charge shown as "Later" was used.

In another plant the mill is charged with 133,000 lb. of balls and rotates at 19.17 r.p.m. Ball charge is as follows:

3 -in. — 20,500 lb.
2 -in. — 78,500 lb.
1¼-in. — 34,000 lb.

133,000 lb.

Ball replacement is figured at 0.111 lb. per ton of raw material ground. Three-inch balls are replaced in the first compartment and 2-in. balls in the second compartment. On the 10th of each month the production is tabulated and ball addition is calculated.

In one plant the mill at first was charged with 130,000 lb. of balls, divided about as follows:

3 -in. — 32,500 lb.
2½-in. — 32,500 lb.
2 -in. — 32,500 lb.
1½-in. — 32,500 lb.

In order to boost production, 25,000 to 30,000 lb. of balls were added to the charge. Measurements are made of power input to the mill, and when they consistently show lower results, more balls are added.

In another plant the mill is charged with 1- to 2½-in. balls as follows:

3-in.—(formerly used but discontinued because it was felt they were not grinding)
2½-in.— 15,000 lb.
2 -in.— 30,000 lb.
1½-in.— 35,000 lb.
1¼-in.— 40,000 lb.
1 -in.— 15,000 lb.

135,000 lb.

Replacement of balls due to wear is being developed by studies of small lots of balls removed from the mill. Preliminary studies have established a recharging of sizes as follows:

2½-in.— 3.6 lb. per 1000 bbl. raw mix
2 -in.— 6.2 lb. per 1000 bbl. raw mix
1½-in.— 7.4 lb. per 1000 bbl. raw mix
1¼-in.—10.7 lb. per 1000 bbl. raw mix

27.9 lb. per 1000 bbl. raw mix

This is a continuing program, and changes may be made as more information on ball wear is accumulated.

For making a direct comparison of ball charge and mills, information has been assembled in Table II. This includes only the ball mills, and not the ball and race mills. Ball changing in this latter mill is a special process, and a description of procedure is included later. It should be mentioned that the first mill listed (9′6″ by 26′) is a two-compartment unit; one section is used for drying, and therefore, for its size, less ball charge is carried.

The column showing "Ball Loss" illustrates one important characteristic of a dry grinding process, *i.e.*, low metal consumption, and it points to the reason for care in adding to the ball charge. A charge made up of new, full-size balls would require considerable operation until an equilibrium size condition was reached, when balls of minimum to maximum size would be present.

The tabulation of ball sizes reflects to some extent the method of preparing feed for the mills. In some plants a slotted hole screen is used for sizing in order to aid the crushing operation and to permit elongated material to pass to the mills. For example, where a ¾-in. nominal opening is used, a product will result containing particles several times the nominal size, in at least one dimension. Where a square hole screen is used, close sizing is obtained, and a consistent feed for the mills is prepared. The 3-in. balls used and the nominal feed sizes are as follows:

¾-in. slot .... 30 percent 3-in.
¾-in. square .. 38 percent 3-in.
⅝-in. square .. 25 percent 3-in.

A further comparison of ball size, feed size, and production shows the effect of preparing a smaller feed for the grinding mill.

Feed Size	Ball Charge Volume Loading	Ton Product Per Ton Balls
¾-in. slot	33%	0.54
⅝-in. slot	37%	0.77
⅝-in. square	40%	0.84

The choice of figures was based on known facts in regard to each plant. In one, the feed is intentionally sized through a ¾-in. slot to assist the quarry operation; it shows the lowest production ratio. The maximum ratio is shown where production is being carried at a high level, and the feed is made to pass a ⅝-in. square hole. In addition, this plant has sufficient crushing capacity to produce a ½-in. feed, if desired.

(*Continued on page* 128)

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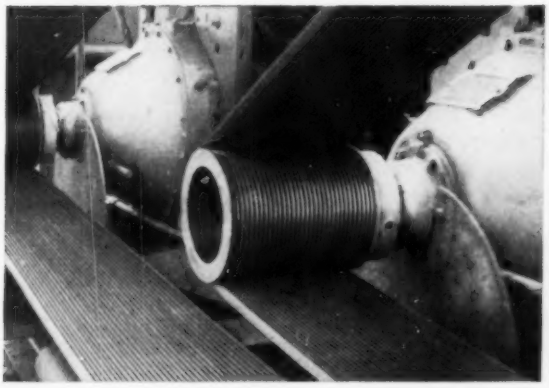

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A view of the new Peerless plant from across the Rouge River during final stages of dock construction. Bulk-loading silos and mill and storage buildings are at the left.

PEERLESS' New Detroit Plant

contributes many firsts to cement-making methods

By WALTER E. TRAUFFER

The Peerless Cement Corporation, a producer of portland cement since 1897, has expanded its operations at intervals throughout the years to keep pace with the growing demand in its market area. The latest step in its long-range program was the completion late in 1956 of its new Brennan Avenue plant in Detroit, Mich., at a cost of $7,500,000. This new wet-process operation, with its 1,200,000-bbl. clinker producing capacity, increased Peerless productive capacity 25 percent. Along with the two other plants, one at Port Huron and the other at Jefferson Avenue in Detroit, Peerless now has a productive capacity of 6,500,000 bbl. annually.

When the continuing shortage of cement influenced the decision to add extra capacity, a market survey was made; and this showed that the greatest need was in the Detroit area, rather than at Port Huron. Lack of space made it impractical to further expand the Jefferson Ave. plant, which had been added to and improved repeatedly over the years; so it was decided to build an entirely new facility as near the original one as possible. The site selected is about 6 miles southwest of the city's center and one-half mile from the Jefferson Ave. plant; and, like it, this operation is located on the River Rouge for the receipt of limestone, gypsum, and coal by boat. As at Port Huron, no suitable limestone is available within economical rail shipping distance. The other Detroit plant had demonstrated that such an operation can meet the strict dust and smoke restrictions; so there was no difficulty in getting the necessary building permit.

The new plant is a complete cement manufacturing operation; but, because of its proximity to the Jefferson Ave. plant, it is considered an extension of that plant and it uses the same machine shop and other service facilities. For the same reason no cement is bagged, provisions being entirely for shipment in bulk. The plant was built with one kiln;

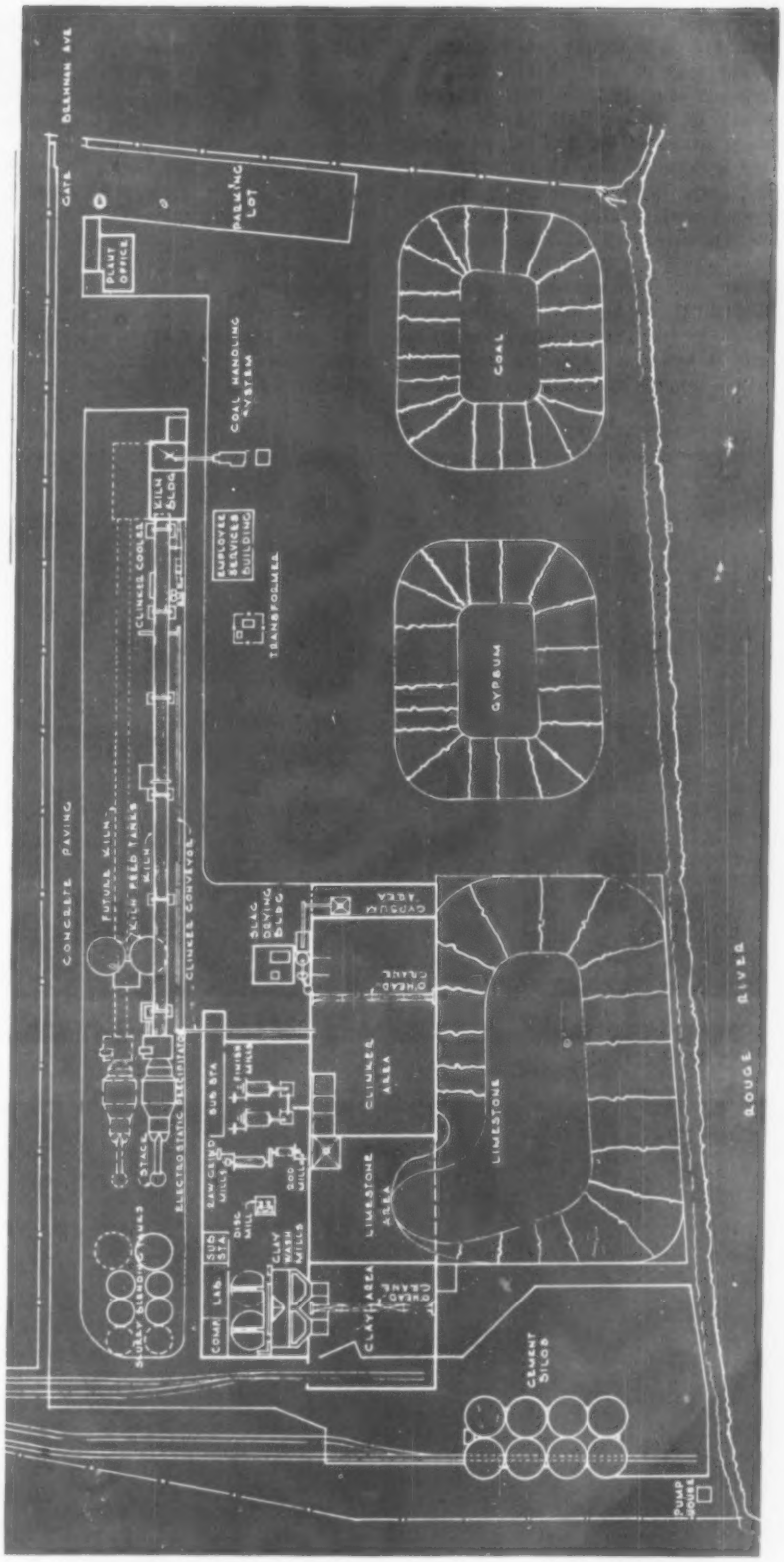
but the design provides ample space on the 14-acre property, so that second and third kilns, with their related equipment, can be readily and economically installed when desired.

This plant has a number of unusual features. One is the use of a rod mill, for the first time in this country, for preliminary grinding of cement raw materials. Notable also is the kiln, which is one of the largest in use in this country. The optional use of disc mills for clay preparation is another feature, as is also the use of a fluidizing reactor for drying slag used in the manufacture of portland slag cement. The kiln capacity of this plant is 1,250,000 bbl. annually, but it has a finish grinding capacity of 1,750,000 bbl., so that it can produce slag cement or grind clinker from other Peerless plants. It is believed to be the first plant in this country to include provisions for the manufacture of portland slag cement in its original design.

The construction of the plant presented only one unusual problem, that of soil stability, and previous experience along the banks of the Rouge River helped to solve this without too much trouble. This is evident from the fact that the first cement was shipped from the plant just one year and 18 days after the first pile was driven. The plant is supported on nearly 3,000 concrete-filled steel piles driven 80 ft. to bed rock; there are 633 piles under the cement silos alone.

The 1,000-ft. long dock area presented a similar problem as it was to be used for the storage of sufficient limestone, gypsum, and coal to carry the plant through the four months when the Great Lakes are closed to navigation. 965 piles 84 ft. long were sunk in the dock area to support the 30-in. thick reinforced concrete mat forming the dock which supports the storage area.

Raw Material The limestone is brought in by self-unloading boats from Calcite, Mich., and the coal comes from West Virginia *via* rail and boat. These boats carry up to 16,500 tons of stone or 12,000 tons of coal. All are boom-type vessels. Stockpiling on the dock is done by the boats, and there is capacity for 125,000 tons of stone and 30,000 tons of coal. Bulldozers are used to move these materials from the piles into the storage building. Clay and gypsum are received by truck or rail and are rehandled to storage. This building is the usual roofed-over structure with open ends and sides. It is 375 ft. long by 100 ft.



Layout of the Peerless Cement Corporation's new plant in Detroit, showing the location of its raw materials dock on the Rouge River.

wide and has capacity for 12,000 tons (12 days' supply) of limestone, 7,000 tons of clay, 3,000 tons of gypsum and 122,000 bbl. (23,000 tons) of clinker. All handling of these materials in and out of storage is done by two 15-ton, 95-ft. 9-in. span P&H overhead traveling cranes with Williams "Favorite" 5-cu. yd. clamshell buckets.

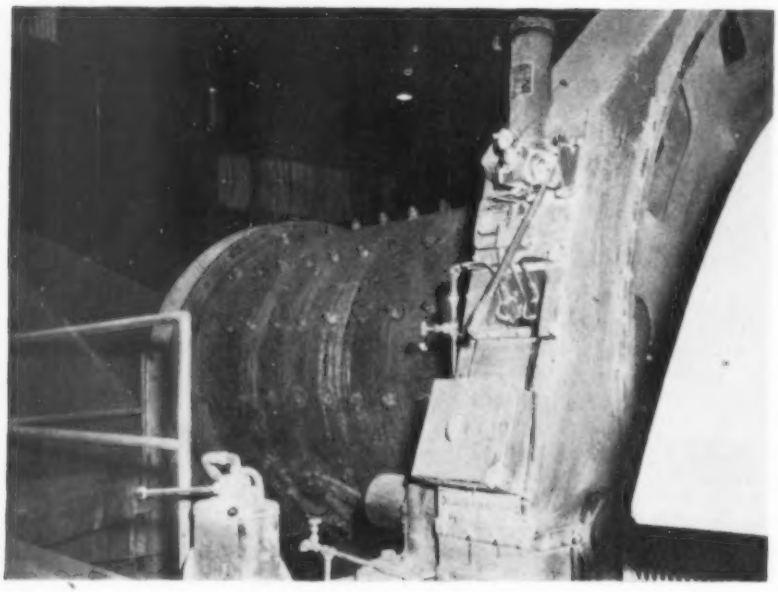
Raw Grinding This cement plant is said to be the first in this country to use a rod mill, and is believed to be the only one to use one for raw grinding. The rod mill was selected because it was thought that it would grind the coarse stone more selectively and give a more uniformly-sized product as tube mill feed. The rod mill and the tube mill operate in series with no intervening pumps, tanks, or feeders. This results in a very simple layout and eliminates the usual screens and pumps, yet obtains the desired result of controlled feed size to the tube mill. Controlling the feed size to the last compartment by a rod mill also leads to a somewhat lower power consumption per unit ground than if a conventional open circuit compartment mill were used. With a feed rate of about 50 t. p. h. to the rod mill, with 95 percent passing ¾ in., the rod mill product is approximately 80 percent passing 20-mesh.

The raw-grinding department is a conventional raw grind with the exception, previously noted, that a rod mill is used for preliminary grinding. However, it is so designed that either one of two optional flows can be operated using the disc mills. In the No. 1 optional flow the limestone can be ground in the rod mill and the Ballpeb mill and then pumped to the limestone slurry storage tanks and proportioned to the correction basin. This limestone slurry can then be used to wash the clay, and the clay-stone mixture is then ground in disc mills before going to the blending tanks. In the No. 2 optional flow the disc mills can be used in the conventional grind following the tube mill. The tube mill product is further reduced and the disc mills also break down the spitzer in the slurry. In this system also the slurry goes to the blending tanks.

Under the present flow the clay is rehandled by the crane from the storage building to one of the two Traylor 26-ft. dia. clay wash mills which are fed 10 cu. yd. per batch. These are followed by 26-ft. dia. tanks 30 ft. deep which are equipped with mechanical and air agitators and have conical bottoms. One mill is now operated at a time in the preparation of clay slip, which is then stored in the two large tanks. The blended clay slip is drawn from these tanks by a 4-in. Wilfley pump to a ferris-wheel feeder which discharges to the rod mill.

The minus ¾-in. limestone is rehandled by the crane to a 318-ton feed bin for the raw-grinding circuit. A Cleveland table feeder discharges it to the drum feeder of the 7- by 14-ft. Allis-Chalmers rod mill. This is driven at 20.8 r.p.m. by a 300-hp. General Electric synchronous motor through a direct gear drive. The mill is loaded with 37 tons of rods—8 tons of 3-in. dia., 13½ tons of 2½-in., and 15½ tons of 2-in. dia. These fill about 40 percent of the volume of the mill. Allis-Chalmers rods are used. Metal consumption is low—about .0384 lb. per bbl. of cement slurry ground. Wear in the tube mill is .0685 lb. per bbl.

The 425-ft. kiln, and stack of the new facility. The conveyors at the left take clinker from the cooler to storage.



The 7- by 14-ft. raw-grinding rod mill with its automatic lubricating system.

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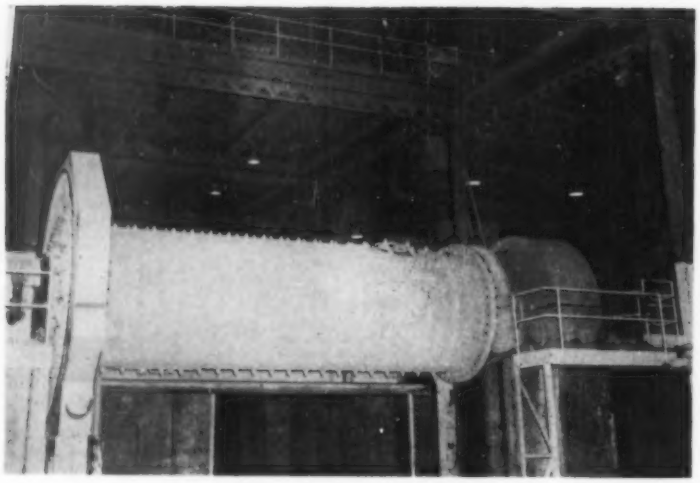
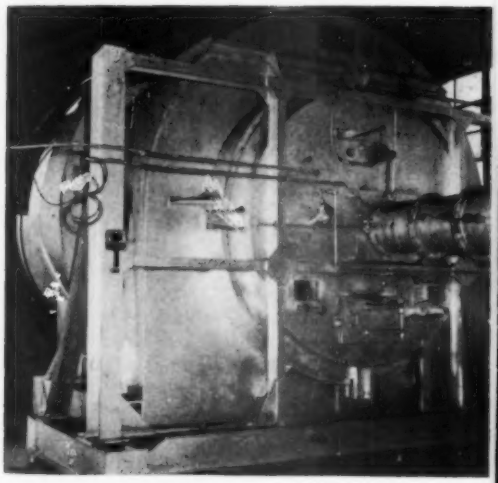
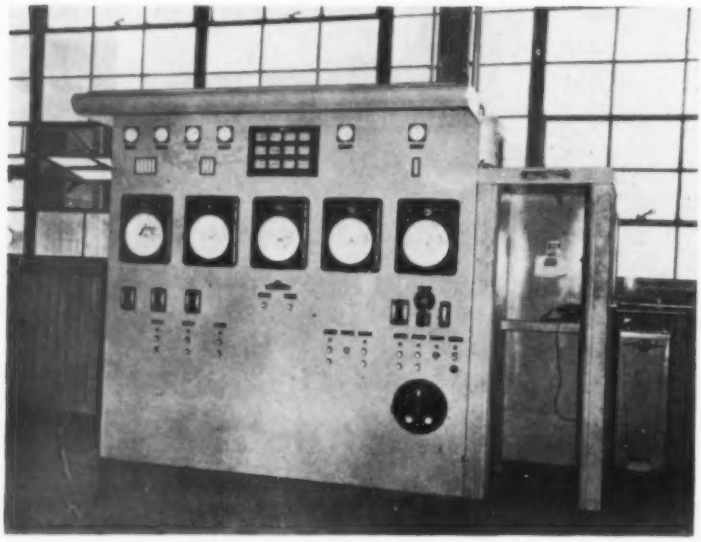


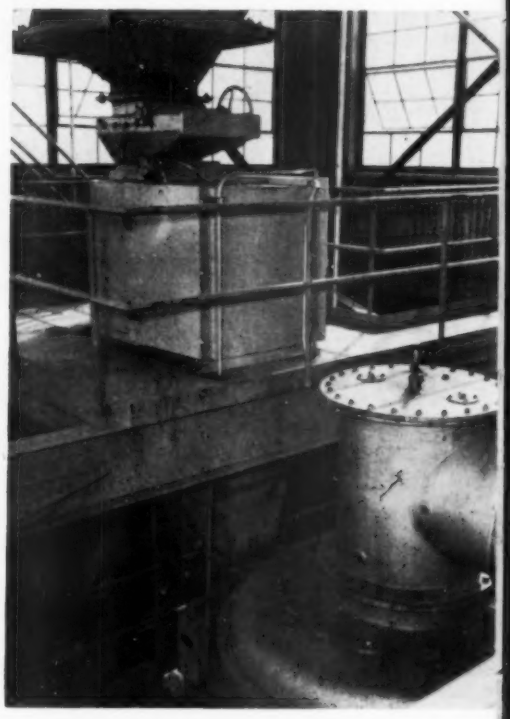
A 7- by 22-ft. raw-grinding ball mill follows the rod mill in circuit.



The firing hood of the 11-ft. 6-in. by 425-ft. rotary kiln.



From this control board on the kiln floor the kiln and related equipment are controlled.



Right: This weighing feeder measures out 200-lb. batches to the coal mill below.

It is aimed to produce slurry ground to a fineness of about 80 percent through 20-mesh at the rod mill. This is discharged into a sump from which a scoop feeds to a 7- by 22-ft. Allis-Chalmers Ballpeb mill, driven at 20.8 r.p.m. by a 400-hp. G. E. synchronous motor through direct gears. The charge consists of 37 tons of 1¼- and 1-in. Sheffield Molycop forged steel balls, taking up 40 percent of the volume of the mill. The resulting limestone slurry is ground to about 82- through 200-mesh at the rate of 58 to 60 t.p.h., and has a solid content of about 32 percent.

A 5-in. Wilfley pump feeds the slurry to any one of four 20-ft. dia. by 25-ft. conical bottom tanks, each with a capacity of 700 bbl. They are equipped with Manitowoc mechanical and air agitators. Three 4-in. Wilfley pumps are used to transfer slurry from tank to tank for blending.

Slurry Feed With any of the three flows, the slurry is blended as desired from the four tanks into a 30-ft. diameter by 25-ft. (1,000-bbl.) correcting tank which is equipped with Manitowoc mechanical and air agitation. All air for slurry agitation and for cement transport is provided by Fuller rotary compressors. A 5-in. Wilfley pump feeds the corrected slurry to the two 1,600-bbl. kiln feed tanks which are also 30 ft. in diameter by 25 ft.

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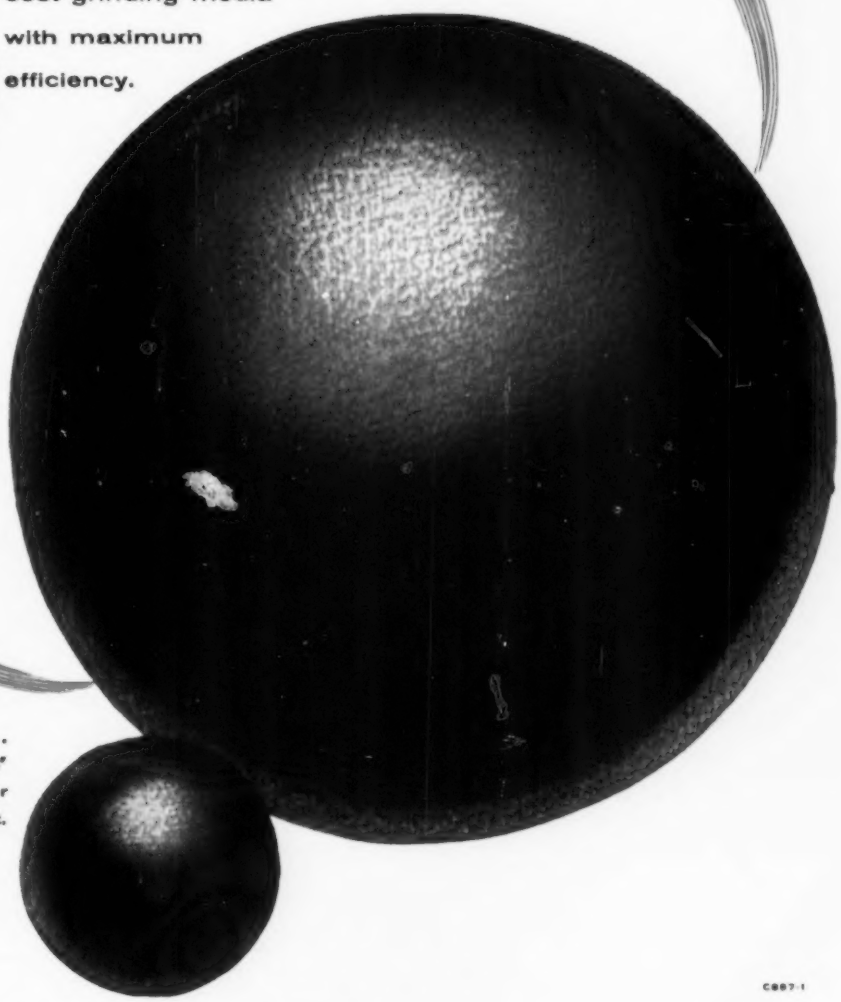

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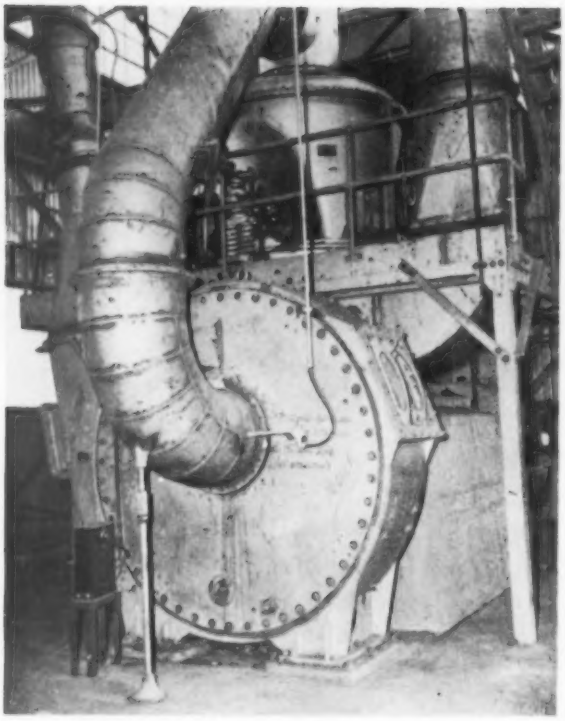
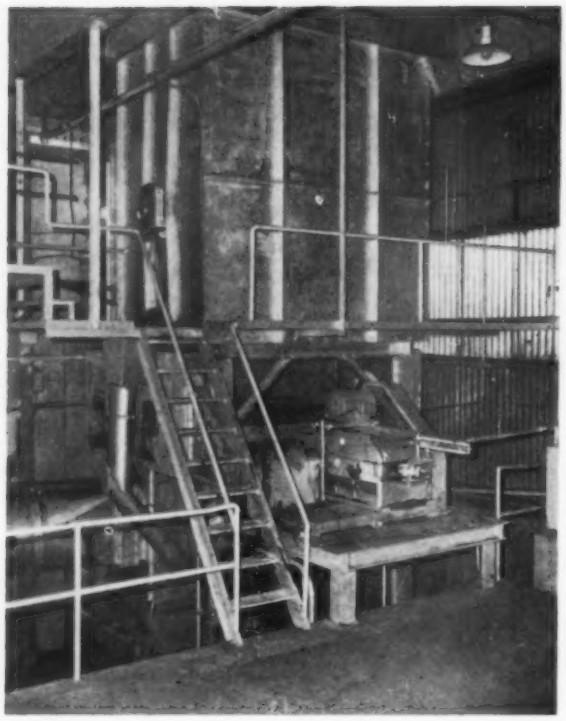


The direct-firing coal mill with its blower (foreground).



The 7- by 44 ft. inclined grate clinker cooler with hammermill (foreground).

deep. These actually function as a single tank as an 8-in. pipe connects them near their bottoms. One of two 5-in. Wilfley pumps feeds the slurry to the Traylor ferris wheel kiln feeder, from which overflow goes back into the tanks. There are also provisions for mixing in collected dust with a pug mill from either or both sections of the stack dust collector ahead of the kiln feed pipe. The feeder is kept in synchronism with the kiln through a generator on the kiln drive which provides current for the feeder motor.

Burning The 11-ft. 6-in. by 425-ft. Traylor all-welded rotary kiln is supported on six sets of rings and rollers and has 27 stiffener rings. It has a slope of ½-in. per foot and is driven at the rate of 1.3 r.p.m. by a 150-hp. General Electric totally-enclosed variable-speed a.-c. motor through a Falk reducer and gears. A G-E Speed Variator unit on the kiln drive keeps the feeder and kiln speeds in synchronism. There is an International Harvester gasoline engine auxiliary drive with a Falk reducer and flexible coupling.

The kiln has a Traylor heat-exchanging chain system 93 ft. long beginning 8 ft. from its feed end. This system has a total of 10,752 ft. of ¾-in. chain suspended by the counter-flow system. There are 738 pieces, each 14 ft. 7 in. long, hanging from rings 42 in. apart. There are 36 holes in each ring. Each chain hangs to the second following ring with 120-degree back counter-rotation. Each succeeding ring is installed one hole further, rotationwise. There is no lining for 40 ft. from the feed end; then there are 73 ft. of 4-in. and 25 ft. of 6-in. 45 percent alumina brick; 137 ft. of 4½-in. insulating brick; 40 ft. of 9-in. 60 percent alumina brick; 50 ft. of 9-in. 70 percent alumina; 50 ft. of 6-in basic brick; and 10 ft. of 9-in. 70 percent alumina brick. The Traylor nose ring is air cooled through an annular space. The kiln hood, which is mounted on rails, is completely lined with plastic rammed insulation held by cast steel ties.

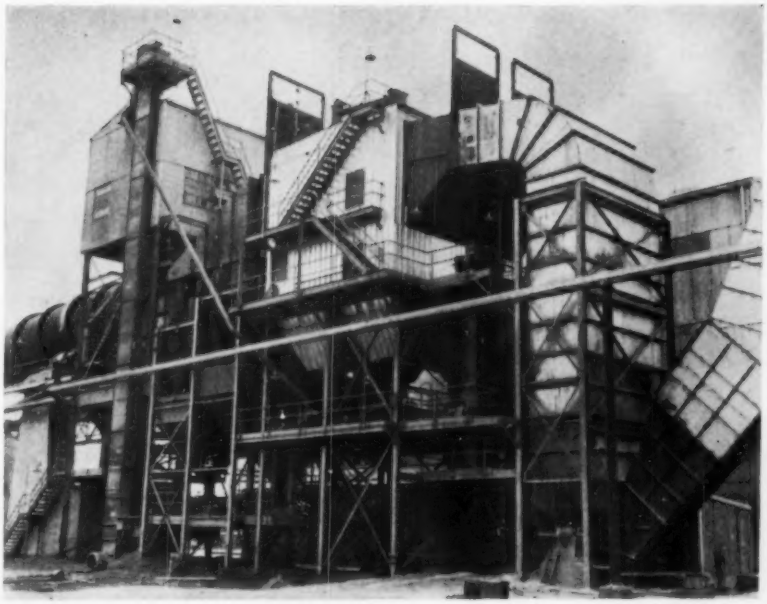
Exhaust gases from the kiln go through an expansion chamber to a Buell combined collector system consisting of a first stage of 16 No. 50 AC-435 cyclones and a second stage of a Model 21W 17.4-434 electric precipitator. The precipitator is divided into two longitudinal sections, each with two compartments. The induced-draft fan, an American Blower No. 641 unit with two inlets, is driven by a 300-hp. G-E motor through a Size 366 Gyrol fluid drive. The 200-ft. Heine reinforced concrete stack is 10 ft. I.D. at the top and has 2 in. of fiberglass between its shell and the 5-in. concrete lining.

Dust from both collectors is reclaimed by a series of screw conveyors and bucket elevators. All of the dust from the cyclone collectors is returned to the kiln feed, to be mixed in with the slurry. The system is so arranged that the dust from either or both sections, and from the first or second or both compartments of the electrostatic precipitators, can be reclaimed or wasted as desired. Any discarded fraction of dust is run through an Allis-Chalmers disc nodulizer to keep down the dust. If desired, these nodules can be fed into the kiln streams. A waste bin is provided from which these nodules can be hauled away in trucks.

In operating the kiln, the back-end kiln temperature is held at 610 to 620 deg. F. The front end temperature ranges from 2,700 to 2,800 deg., and the primary air from the coal mill is about 180 deg. at the fan. Moisture at the end of the chain system is held between 1 and 2 percent. Draft at the kiln hood is about 0.2 in. negative pressure.

All instruments for the kiln and its appurtenant equipment are on a

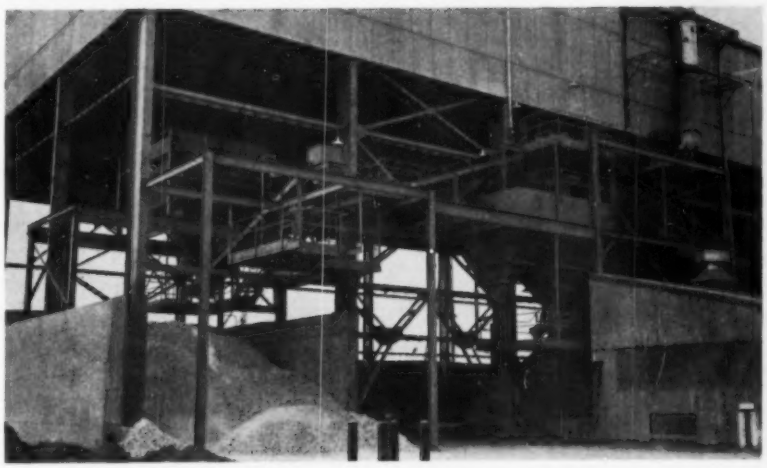
This view at the feed end of kiln shows the cyclone-type collector and electrostatic precipitator and the dust return elevator to the kiln feed.



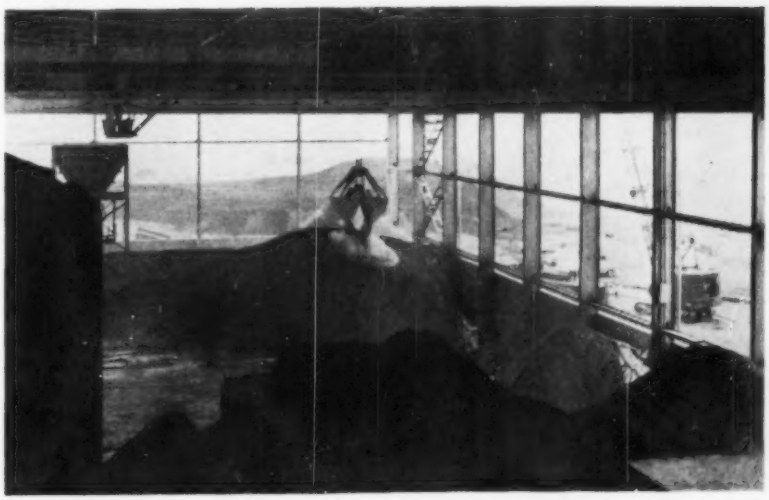
Bailey control board on the kiln floor. There is a feed-end temperature recorder and an analyzer for oxygen and combustibles. A Rayotube indicates burning zone temperature, and there is a recorder for the No. 1 zone in the cooler and for its vent stack, and also one for the coal mill fan. There are speed recorders for the kiln and for the cooler grate.

Coal Preparation The kiln is direct fired with pulverized coal from a No. 593 Raymond bowl mill. This has a No. 2674V exhauster and is driven by a 250-hp. G-E motor. The tip of the burner pipe is 17-in. I.D. mild steel, lagged with refractories, and extends 21 in. inside the kiln hood. The coal is West Virginia Fairmount seam, rated at 13,200 B.t.u. with 7½ percent ash, 3 percent sulphur; it is 1½ in. in size and under. Coal is rehandled from the dock stockpile by a bulldozer to a dumping hopper. A belt conveyor, a bucket elevator, and another conveyor in series feed the coal to a 160-ton storage bin over the coal mill. A Stock Equipment Company weighing feeder weighs out 200-lb. batches which go to the coal mill feeder. The latter is equipped with Louis Allis Dynamatic control. Air for drying the coal is drawn from the kiln hood through a cyclone which removes any clinker particles, and the temperature is automatically controlled by a damper which tempers with atmospheric air.

Clinker Cooling Clinker is discharged from the kiln into the 7- by 44-ft. Fuller inclined-grate cooler, which is of standard design. It has a 10-degree slope, and three compartments; there is a hammermill to break down lumps. Hot air is drawn through a Western Precipitation No. 9 VC Multiclone, and the desired amount is used as secondary air for the kiln. Clinker is discharged at about 125 deg. F. to a drag chain conveyor which runs down the center of the cooler. This feeds to a belt conveyor system to storage consisting of three 24-in. conveyors which are respectively 33 ft. 7 in., 327 ft. 6 in. and 107 ft. 7 in. long. These run alongside the kiln



A view of the slag-handling and drying department in the storage building.



An interior view of the storage building shows one of two 5-cu. yd. cranes handling limestone, clay, clinker, and gypsum.

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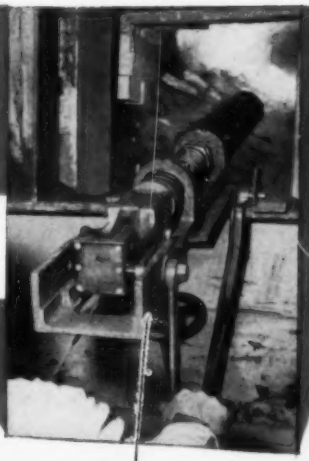

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EXCLUSIVE *NEW* MUFFLER*—Compact! Proved in sound tests! Cuts firing noise to an amazingly low level. So compact it won't block kiln doors or impair aim.

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The feeders which supply clinker and gypsum to the finish mills.

and then across to the storage building into which the clinker is discharged *via* a stone ladder to reduce dust loss. They have Quaker Tri-Circle special hot-material belts with 4-ply R-40 synthetic fabric and 3/16-in. top and bottom covers. The return idlers are so arranged that each belt is turned over 180 deg. on the return trip, so that both sides are used alternately. Splices were vulcanized in place.

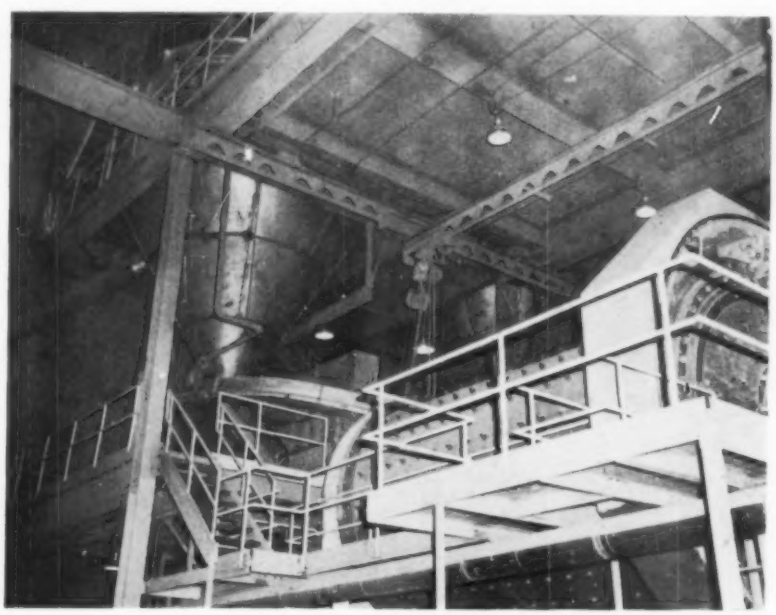
Slag Preparation Along with other producers, Peerless went into the production of portland slag cement to help overcome the shortages in recent years, and this type has become an established product in the Detroit area. The new plant was therefore designed for the alternate production of this type of cement; but instead of buying dried slag at high cost it was decided to dry the slag at the plant. After considerable investigation of various methods, the Dorr Fluodryer system was selected and put into operation in October, 1956. Only a few weeks of operation were possible before winter set in, but this period demonstrated the ability of the system to reduce slag of 20 percent moisture content to between 0.1 and 0.2 percent at the rate of 30 t.p.h. This is the second Fluodryer to be installed in the domestic cement industry; the first one went into a Southern plant for drying limestone.

The raw wet slag is kept in a 2,000-ton open stockpile, from which it is handled by bulldozer or crane to a hopper. A vibrating feeder discharges on a belt conveyor to a 3- by 8-ft. Allis-Chalmers Aerovibe 1-deck screen with 3/8-in. openings. The small amount of oversize is scalped off to waste. A Jeffrey vibrating feeder discharges the slag through a Stock air-operated flow gate into the Fluodryer. This is 8 ft. in inside diameter and consists of a reactor chamber above a combustion chamber, both refractory lined. The Fluodryer operates on 25 in. of air supplied at 12,500 c.f.m., and the fluidizing bed is held at 24 to 25 in. depth. Fuel is Bunker C oil through a Hauck burner, and 50 g.p.h. is used to maintain the 220 deg. F. temperature necessary for fluidity. A booster air line blower supplies the primary air for the burner. Secondary air to the dryer comes into the combustion chamber tangentially for thorough mixing. The moisture-laden air from the Fluodryer goes to a Ducon cyclone collector, the dust being returned to the dry stream. A Chain Belt bucket elevator discharges the dried slag into a section of the storage building. The Fluodryer needs very little attention; one man looks at it about every ½ hour. It is started up manually but stops automatically when the feed is shut off, leaving only the propane gas pilot flame burning.

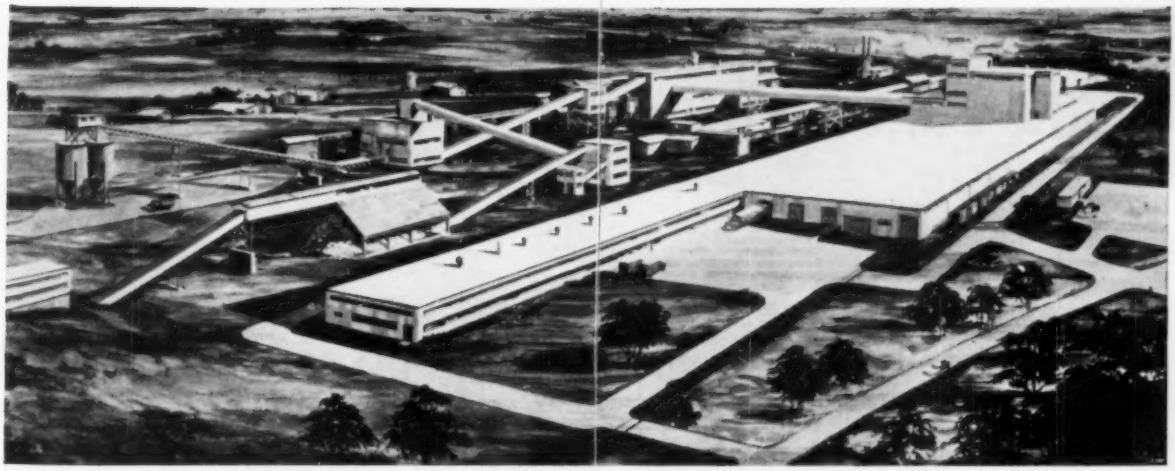
Finish Grinding In the storage building there are two 230-ton mill feed hoppers for clinker, and between them is a 190-ton hopper for gypsum. Both are fed from storage by one of the overhead cranes. When slag is used, it is used in both mills. Blending of the slag with the clinker is done in the corner of the storage by the crane in proportions as desired. The crane then feeds the blended mix to the feed hoppers. Jeffrey Waytrol feeders are used under the hoppers—No. 330 for clinker and No. 118 for gypsum. Belt conveyors and bucket elevators in series feed these materials, in the desired proportions, into the mills. Liquid additives—air-entraining or grinding aids—are added at the feeders.

Each of the two 10-ft. 6-in. by 17-

(*Continued on page* 144)



One of the two 10-ft. 6-in. by 17-ft. finish mills, shown with two separators (left and background).



Barber-Greene installation at new Celotex plant. Ten of the eleven conveyors are housed. Building at far left houses primary crushers. At right is wallboard plant. Mill is in background.

(Left). Material rejected by the separator is carried to two storage bins by this 329-foot Barber-Greene conveyor. Standard 60-inch truss minimizes the number of supports required. (Right). A 422-foot conveyor in gallery utilizes traveling tripper to build long stockpiles.

1600′ conveyor system serves new Celotex plant

Eleven Barber-Greene conveyors are incorporated in the design of a new plant of the Celotex Corporation.

The 1600-foot conveyor system handles every product from the raw, heavy gypsum rock to the fine finished plaster. This processing requires a wide variety of types and sizes of conveyors—all coordinated to deliver continuous high capacity at lowest operating cost.

Built with *standardized* components, these versatile conveyors are delivered faster, go up easier and require less costly engineering time.

These pre-engineered components can be used in almost limitless combinations, from the most complex systems right down to the small setups requiring a single conveyor. When it comes to adapting Barber-Greene conveyors to meet changing needs, standardized components make the job easier, faster and more economical.

Write for literature on the conveyors pre-engineered to cut costs

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CONVEYORS . . . LOADERS . . . DITCHERS . . . ASPHALT PAVING EQUIPMENT

expansion plans follow construction as

Texas Portland Cement

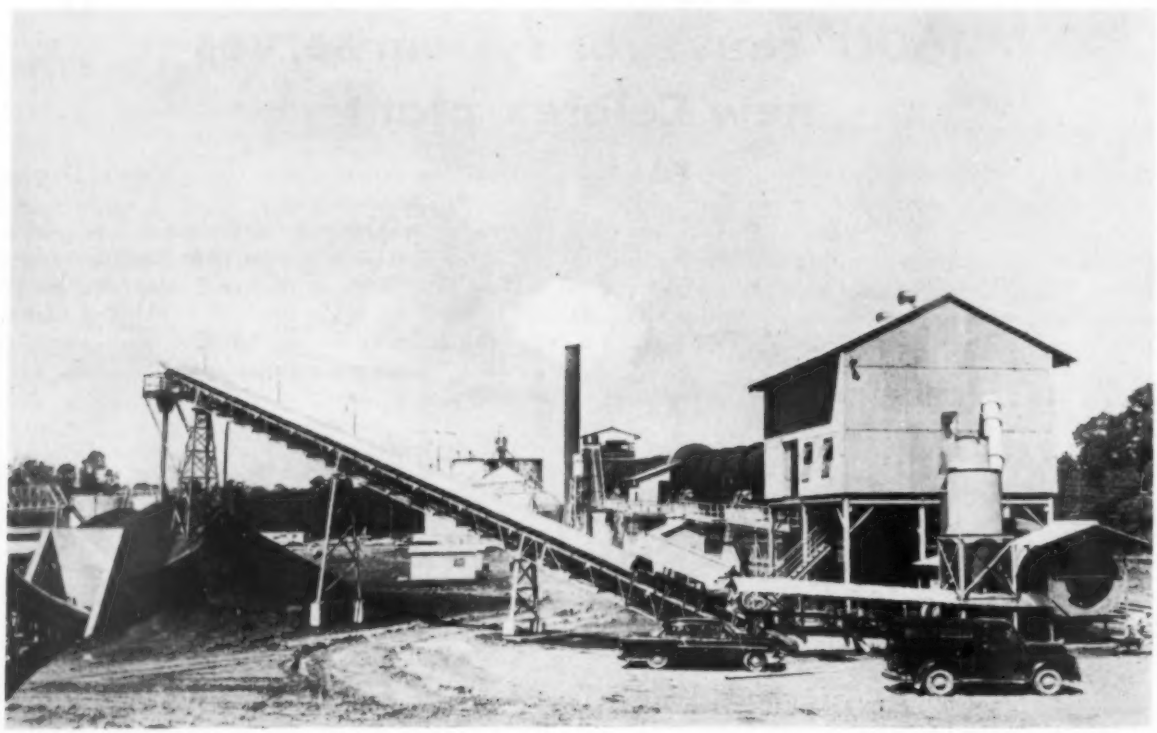
Puts New Mill in Production

By BUREN C. HEROD

ANOTHER ON THE SPOT REPORT

With its origin found in the belief that growing population and its corollary requirements for more homes, highways, plants, and other material needs will maintain a continued demand upon the cement industry—a demand that cannot be met without further expansion in production facilities—the new 680,000-bbl.-per-year cement plant of the Texas Portland Cement Company near Orange, Tex., is a tangible result of that thinking.

Although production was initiated only early this year, on March 20, the company's philosophy, reflecting that of its president and founder, Kent B. Diehl Sr., is such that the original design provided for future expansion with the minimum of further engineering and no disruption of operations. In fact, the planning for a new 3,000-bbl.-per-day kiln as a companion to the present 2,000-



An overall view of the kiln installation. The entire layout has been designed to provide for ease of equipment installation in future expansion, without dismantling or disruption of present operating phases.

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Select the best for each particular purpose from the full complement of types and classes of refractories which are especially suited for the various conditions involved in the many different rotary kiln operations.

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The oyster shell storage pile and reclaiming tunnel, center, and clay wash mill, left. Just beyond is one of the weirs that form a Y-basin for handling barge traffic. This basin is about 1,500 ft. from the main channel of the Sabine River.

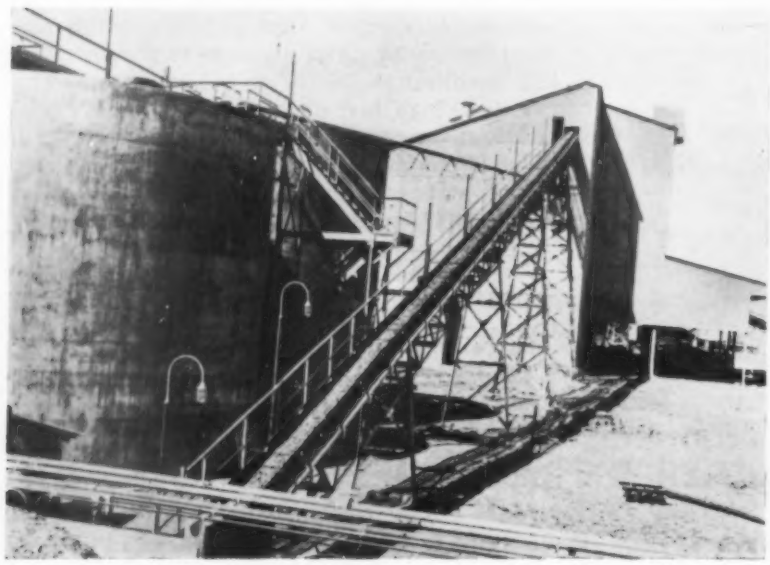
bbl. unit has been completed; and it is expected that the second kiln will be in operation by the end of this year as a step toward the ultimate production goal of 6,500 bbl. per day.

Representing an investment of over $4,000,000, the new facility was the first on which construction was initiated in the area between Baton Rouge, La., and Houston, Tex. Located on the Sabine River a few miles upstream from Orange, this wet process plant, using oyster shell from Galveston Bay, is expected to play a significant role in meeting demands of heavy industry in the Port Arthur, Beaumont, Orange, and Lake Charles market area. Furnishing strong support to that expectation is the fact that consignments for the next six months' production had already been made when the facility went into operation in March.

Based on a plan developed by Mr. Diehl, the detailed engineering was done in co-operation with James H. Howard & Associates, Consulting Engineers, Houston, Tex., and the Kennedy-Van Saun Manufacturing & Engineering Corporation, who also supplied all machinery and equipment. With Texas Portland itself as the prime contractor, construction of the plant was subcontracted to local and other builders. Assistance during erection of equipment, as well as during initial kiln operations, was rendered by representatives of the Kennedy-Van Saun organization.

As noted previously, one of the main factors in selecting the site of the new plant was the market demand of the area. In addition, its location on the Sabine River is readily accessible for barge shipments of shell used in the process, and also for future barge shipments of finished product. With a designed daily capacity of 2,000 bbl. from the present installation, it was laid out in such a manner that no dismantling or tearing out of existing construction will be required for further expansion. For example, power supply conduit is already installed to those points where additional equipment will be provided. Basically, all that will be needed for the coming expansion, in addition to the future kiln, raw mill, and finish mill, are the necessary concrete supporting structures.

Shell being transported to the mill building. At the left are the clay slip agitator tank and the reclaimed process water tank.



Unusual features of the new facility include an air-quenching rotary clinker cooler, apparently the first of its type in this country. Due in part to the cooler, and in part to the material, the average size of the clinker is finer than found in most operations. Tests have shown a ½-in clinker, and the clinker is cool upon discharge from the cooler, indicating an extremely high heat recovery. Another point concerns the closed raw mill circuit which involves a rake and bowl classifier, and a 150-ft. thickener for dewatering the classifier overflow.

At the time construction was started on grading and pier work late in 1955, a 1,500-ft. access channel was dredged to the plant site from the main channel of the Sabine River. Two weirs were excavated to provide a Y-basin for barges carrying incoming shell. This material is unloaded to a storage pile, maintained at about 20,000 cu. yd., by a Koehring 405 fitted as a crane with a 2-cu. yd. clamshell. On one of the channels adjacent to the plant, facilities are provided for bulk loading into barges.

Clay for the operation is trucked in from a company-owned pit, where

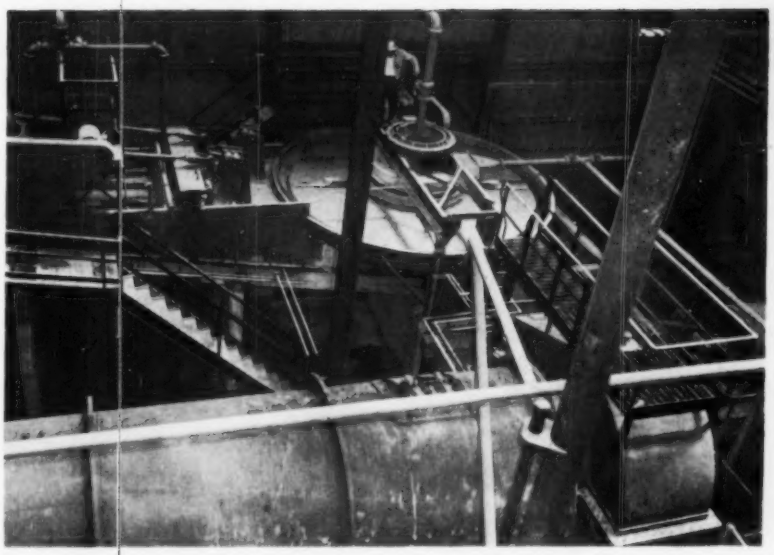
the material is excavated by a contract operator. However, the plant is so located that all or any part of the clay can be received by barge, truck, or rail. From its stockpile near the shell storage area, the clay is transferred by an Allis-Chalmers front-end loader to a clay wash mill. Built by K-VS to Mr. Diehl's design, the mixer is provided with a 60-hp. motor for blade drive. The mixer motor, as well as the balance of electrical equipment throughout the operation, is a General Electric product.

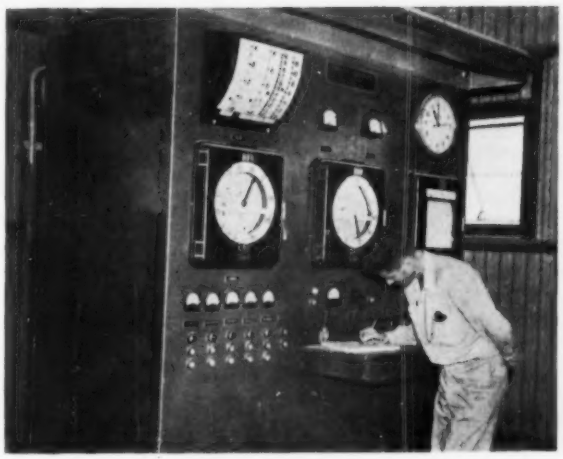
Transferred from the wash mill by a 4- by 3-in. Morris pump, the clay slip is discharged into a concrete tank of 52,000-cu. ft. capacity. Equipped with a Dorrco agitator, the clay slip tank is drawn upon for feed to the raw mill; it may also be diverted to a storage tank. Morris pumps are used for transferring all slurry ahead of the kiln feed, and either of the two 100-g.p.m. pumps installed by the agitator may be used in the above clay slip systems.

From the oyster shell storage pile this raw material is started on its flow to the raw mill through manually-operated ratchet and pinion gates in two tunnels below the pile. These tunnels, each housing a 12-in. by 45-ft. drag chain conveyor, converge to form a V. At the point of the V the shell is discharged onto a 24-in. by 300-ft. inclined belt conveyor on which it is transported to a mill feed bin. Equipped with a Goodyear belt and a Rockwell gear drive on the head pulley, the conveyor moves shell at the rate of 80 t.p.h.

The present mill building houses both the raw and the finish mills, as well as the bins for shell, clinker, iron, gypsum, and additives. Bins for the former two are of the same capacities—4,250 cu. ft. of material—while the iron and gypsum bins are of the same size, each with 2,125 cu. ft. Additives are stored in two other small bins. The bins are designed to provide capacity facilities, fully utilizing the 40-hour week.

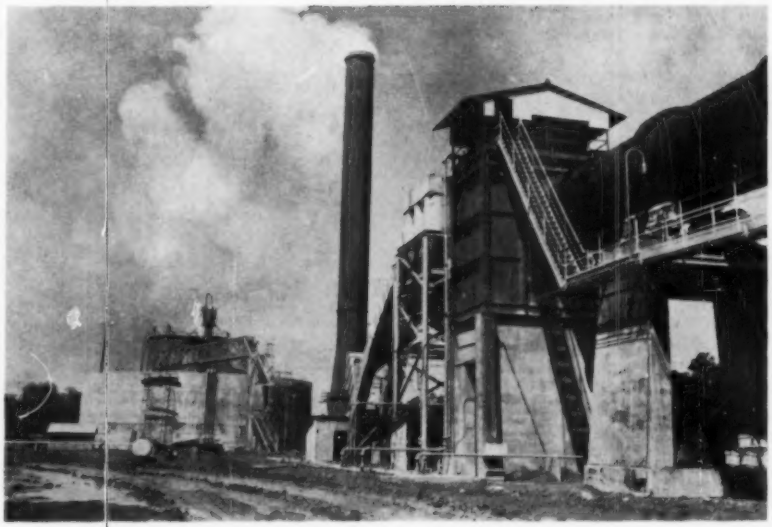
Iron and gypsum, received by rail, are rehandled by an Atlas car unloader and a short belt conveyor into a feed hopper. The material being handled is transferred from the hopper on an 18-in. by 10-ft. pan feeder to the boot of a 40-ft. bucket elevator, in which it can be raised to





Above: In the foreground is the 8- by 26-ft., 2-compartment raw mill, and just beyond is the rake and bowl classifier with which it operates in closed raw-grinding circuit.

Right: Kiln instruments and recorders, as well as controls for the stack louvres, are mounted on this panel.



This view of the feed end of the kiln shows the cyclone-type dust collector, the 7- by 100-ft. stack, and the kiln feed tank, background.

the top of the mill building at 20 t.p.h. Here it is directed to the appropriate bin through a splitter box.

Jeffrey Waytrol feeders, installed below each bin, are interlocked with their respective milling circuits. Shell feed to the raw mill is set at the maximum of 30 t.p.h. Clay slip, representing 15 percent of the feed to the raw mill, is delivered to the latter by a variable-speed clay slip feeder supplied from the agitator tank.

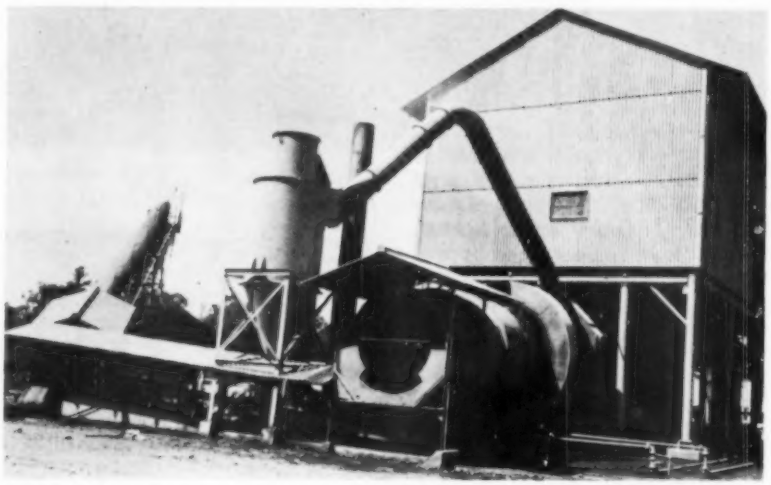
The 8- by 26-ft. two-compartment raw mill is driven at approximately 19 r.p.m. by a 700-hp. synchronous motor through a magnetic clutch. The primary compartment is charged with 9,000 lb. of 3-in. and 30,430 lb. of 2½-in. grinding balls, respectively; while the secondary has a charge of 96,340 lb. of 1¼-in. balls.

Mill discharge is transferred to an adjacent Dorrco rake and bowl classifier by a pair of 120-g.p.m. slurry pumps. Underflow from the classifier is returned to the raw mill in closing that grinding circuit, while the overflow—at about 25 percent solids—is transferred by a pair of 850-g.p.m. pumps to a 150-ft. Dorr thickener producing 90 percent through a 200-mesh raw feed.

Mixer arms in the thickener, which is a concrete basin about 17 ft. deep in the center and 13-ft. at the circumference, are driven by a 3-hp. motor through V-belts. Overflow is received in a tank from which it is pumped as reclaimed process water to a tank adjoining the clay slip agitator, to be returned to the raw mill as make-up water.

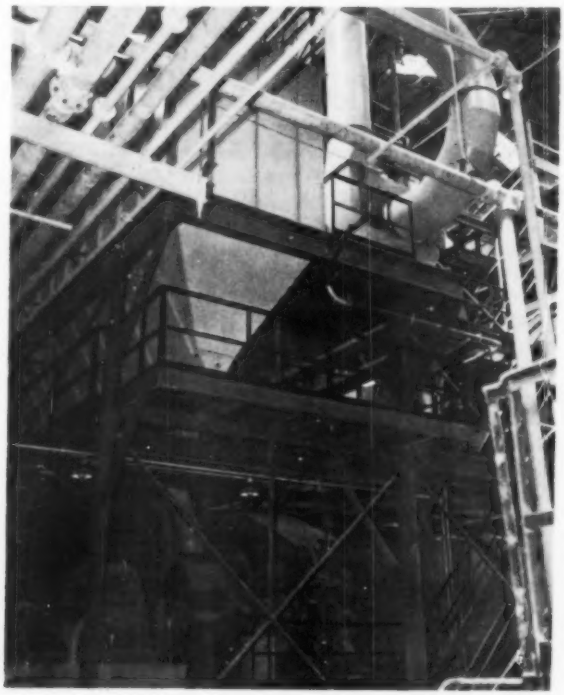
At 60 percent solids, the slurry is removed from the thickener by either of two 230-g.p.m. pumps, one being kept on standby, and transferred at the rate of 30 t.p.h. to a group of four 30- by 30-ft. concrete tanks. As noted above, one of these is reserved for clay slip. The other three are used primarily for storage of slurry from the thickener, and secondarily for blending or proportioning. Each has a capacity of 1,765 bbl. at a point 5 ft. from the top. A transfer system provides for pumping from any one tank into any of the others. All tanks are equipped with Dorrco agitators driven by 5-hp. motors.

Slurry transferred from the storage tanks to a 2,300-bbl. blending tank is mixed with clay slip in proportions required for a specific batch which is in turn pumped to the 8,000-bbl. capacity kiln feed tank. The ferris wheel feeder for the kiln is supplied from the feed tank by a pair of 110-g.p.m. slurry pumps.

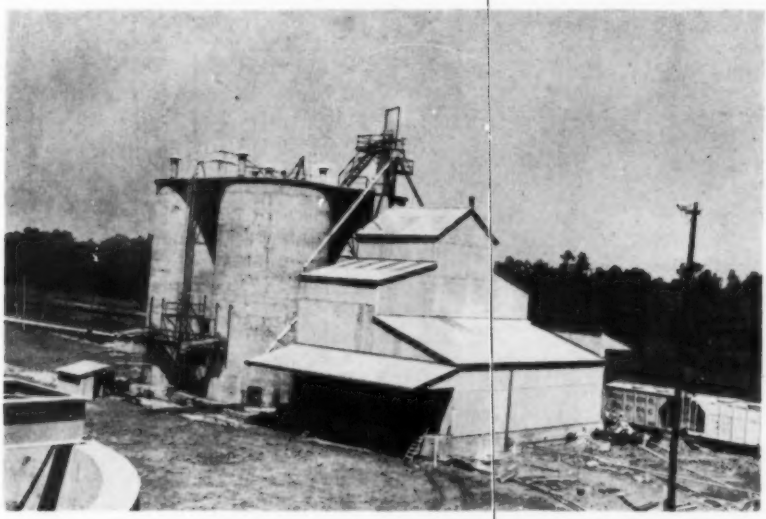


Clinker discharged from this unique 8- by 60-ft. air-quenching rotary cooler may be hand-held. At the left is the conveying system transferring clinker to a stockpile over a reclaiming tunnel.

Right: The compact arrangement of the mill building can be seen in this view, showing the finish mill with the dust collector and separator above.



A view of feeder installations below the bins in the mill building. The units shown here supply the finish mill.



Each of the four silos adjoining the packhouse has a 10,000-bbl. capacity. Provision is made for rail and truck bulk loading, as well as bagging. In addition, an 11,000-bbl. silo beside one of the weirs accommodates barge loading.

Fired with natural gas, the new kiln is 10 ft. in diameter by 300 ft. in length, and rides on five tires. It is lined with Mexico refractories and fitted with a chain curtain system for the first 70 ft. from the feed end. The kiln is turned at about 62 r.p.h. by a 100-hp. motor through a Falk herringbone gear reducer. A Continental 35-hp. Red Seal motor is provided as an emergency drive unit.

Primary air is provided by a 150-hp. fan that also draws through the cooler for air quenching of the clinker, and pre-heating. Through a take-off, air is supplied to the burner. Although the initial run-in had not provided final operating data, it is expected that 1,000,000 B.t.u. will be consumed per bbl. of clinker produced. Firing temperature is maintained at 2,600 degrees.

Instrumentation includes kiln draft gauges, a cooler draft gauge, an O_2 analyzer, a kiln r.p.m. indicator, and a Rayotube optical pyrometer. Control for the stack louvres are also mounted on the instrument and control panel. Exhaust gases at 450 deg. F., after passing through a dust chamber, are drawn through a group of nine cyclones in a Buell dust collector prior to entering the 7- by 100-ft. stack. The latter is also lined with Mexico refractories.

Particles settling in the dust chamber and collected in the cyclones are dropped to a common screw conveyor and fed to a dust fluidizing tank. Overflow from the kiln slurry feeder is piped to this tank, and then pumped back to one of the slurry storage tanks after reclaiming the dust.

Through a transfer chamber at the firing end of the kiln, the clinker is discharged to the 8- by 60-ft. cooler. Driven by a 25-hp. motor, this unit is turned at about 120 r.p.h. Clinker discharged from the cooler may be hand-held, and is received on a natural frequency 40-ft. pan conveyor for transfer to a 24-in. inclined stockpiling conveyor.

The clinker stockpile is established over a tunnel housing the lower end of a 24-in. by 250-ft. reclaiming conveyor on which the clinker is transported to the mill building. Clinker is drawn through manually-operated gates onto the conveyor which, with a belt speed of 300 f.p.m., can transfer up to 200 t.p.h. of material, although 140 t.p.h. is the present rate.

Fed from the clinker bin, *via* the Waytrol feeder previously described, the finish mill is turned at approximately 22 r.p.m. by a 700-hp. motor through a magnetic clutch identical to the drive on the raw mill. Also a 2-compartment unit, this 9- by 26-ft. finish mill is charged with 18,290 lb. of 3-in., and 20,460 lb. of 2-in. grinding balls in the primary end; it carries 103,080 lb. of 1-in. balls in the secondary.

The mill operates in closed circuit with an 18-ft. Sturtevant air separator. Mill discharge is raised in a 60-ft. bucket elevator and piped to the separator. Tailings are returned to the mill, and the finished product

A. V. Luna, physical tester, and J. R. Wright, chief chemist, in the well-equipped laboratory, which is maintained under carefully controlled temperature and humidity conditions.

Allan Moore, left, works manager of the new plant; and C. A. MacQuahe, mill foreman.

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PIT, MINE AND QUARRY EQUIPMENT HEADQUARTERS SINCE 1835

253 Wall Street, Hollidaysburg, Pennsylvania

piped to a hopper that feeds a pneumatic transport cement pump. A Norblo 624A bag filter with a No. 80 Norblo fan collects from the mill and elevator and transfers the dust to the pump hopper.

Air is provided at 100 p.s.i. for cement pumping by either of two compressors. From the hopper in the mill building, the cement is transferred through a 4-in. line to an 11,000-bbl. bin adjacent to one of the weirs where barges may be loaded, and to the group of four silos (each having a capacity of 10,000 bbl.) from which bulk rail and truck shipments and the bagging operation are supplied.

Loading spouts are installed on one side of the silos for trucks, which are weighed out over an 150-ton Webb truck scale, and on the other for rail car loading. Cement is drawn from the bottom of the silos for transfer to the packhouse by pneumatic slides that transport it to the boot of an 80-ft. elevator. From the latter the cement is discharged into the hopper of the bagger—a 3-spout St. Regis unit. Provision is also made for piping material from the elevator to truck- and rail-loading points.

The cement piped to the bagging machine hopper is first passed over a 3- by 6-ft. vibrating screen for removal of any possible tramp iron or any other undesirable metals. The screen is fitted with a $\frac{3}{16}$-in. mesh screencloth. A 5,000-c.f.m. Norblo dust collector installed in the bagging system discharges to a screw conveyor that also receives spilled cement from the bagger. This conveyor returns the material to the bucket elevator supplying the bagger hopper. Bagged cement is transferred to either the truck or rail docks, on opposite sides of the packhouse, on a 30-in. by 40-ft. K-VS conveyor with a wire mesh belt.

In addition to supplying the barge loading bin directly from the finish mill building, provision also is made for piping cement to that bin from any of the four silos. It is also possible to transfer the finished product from the spilled cement conveyor in the packhouse to the barge-loading bin.

Laboratory control is an important factor in the operation, particularly during early production, in view of the fact that the mill has only recently gotten under way. Equipped with Baldwin-Emery and Riehle testing machines, an American Instrument Company autoclave, a Wagner turbidimeter, and a moist cabinet, the laboratory itself

is closely controlled as to humidity and temperature conditions, which are maintained at 68 percent and 72 deg. F., respectively.

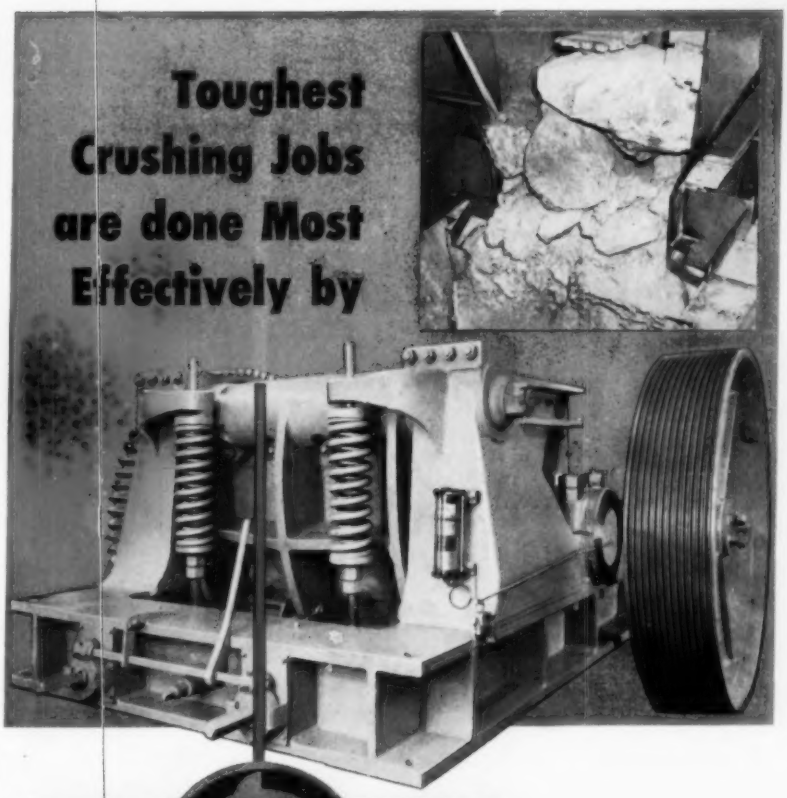
Until the correct clinker was established, and a coating developed in the kiln during initial operations, tests were run on the raw mill discharge. At present, control tests are run on the slurry classifier for fineness (200-mesh) and on the thickener underflow for moisture content. Every hour, CaO tests are run on the raw grind, and every 2 hours acid-alkali tests are run on samples from the kiln slurry feeder. The latter is done in addition to the chemical analyses made after adding clay slip to the slurry in the blending tank in establishing a batch.

Clinker samples are checked every hour, and a composite sample is analyzed for each 8-hour shift. Air permeability, along with determination of 325-mesh percentage, is also checked on the finish mill product every hour. Every 2 to 3 hours a sulphate analysis on finish mill samples is run on the turbidimeter. Regular physical tests are run on 24-hour strengths of the cement.

Operations at the new Orange plant are headed by Allan Moore, works manager, who has a background of long experience in the cement industry on the Pacific Coast, and J. R. Wright, chief chemist. C. A. MacQuahe is general mill foreman.

The Texas Portland Cement Co. mill is the first of several current projects Mr. Diehl has brought to completion. Construction of the Mississippi Valley Portland Cement Company is now under way, and organization and engineering for the New Mexico Portland Cement Company is being rapidly completed. At Clarkdale, Ariz., Mr. Diehl and his associates are engaged in revamping certain phases, including crushing and conveying systems, of the former Phelps-Dodge smelter operation in developing a cement mill at the location.

On a plant site located adjacent to the Aluminum Company of America on the Columbia River, Vancouver, Wash., the Edna Bay Pure Stone Company, a newly-formed concern in which Mr. Diehl has an interest, will start construction in July of a 300-ton-per-day lime plant. Raw stone will be shipped from Edna Bay, Alaska (on the south tip of the Prince of Wales Island), from a limestone deposit of chemical-grade limestone obtained from the Aluminum Company of America.



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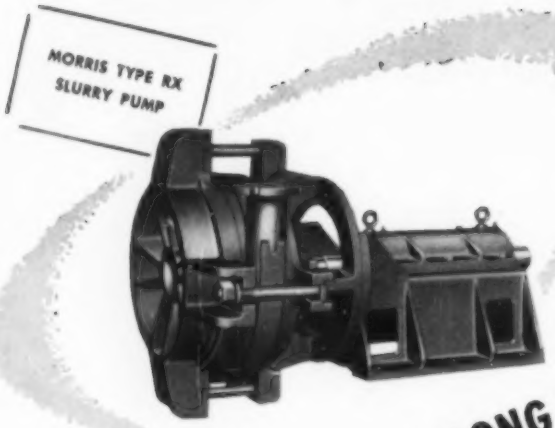

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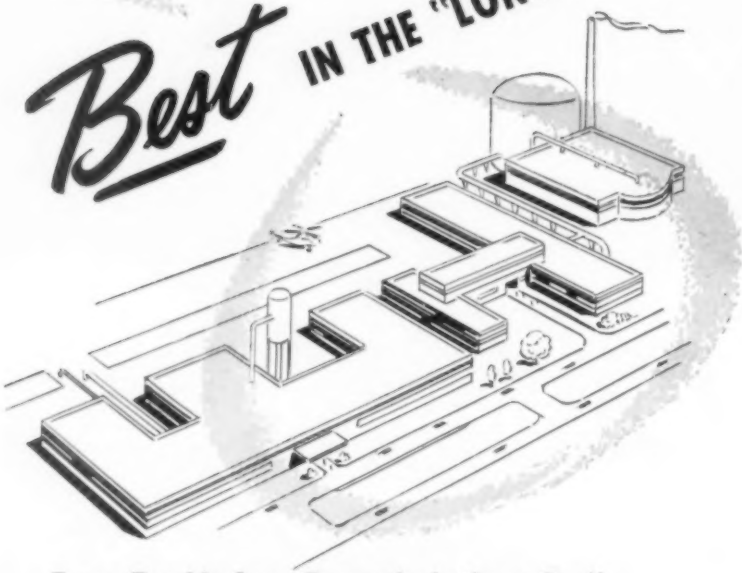

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Raw Mix Drying

(*From page* 105)

CLASSIFIERS

The radial flow classifier and the air separator are used on the combined drying and grinding systems, and some interesting facts in regard to these items have been collected. No maintenance of great extent has been necessary on the one installation of the radial flow classifier. The separators have required attention of different kinds including:

(a) Larger motor, going from 100 to 125 hp.

(b) Replacement of gears in drive

(c) Replacement of wear liners in many points in the separator, experience varying according to materials ground

(d) Lowering of inner cone lower edge to get away from oversize going through into the fines in the outer cone

(e) Removal of flat distributor plate, and use of conical distributor to aid in reducing wear on fan blades and replacement of plate

(f) Use of external speed reducer between motor and separator drive

In one instance a temperature limit of 600 deg. F. is placed on the hot air in the separator to avoid possible failures due to metal fatigue.

Figure 2 (p. 100) shows the air separator used for air drying. The path of hot air is indicated by arrows.

Separators with wear plates in critical locations and with modifications to suit individual applications are supplied by the manufacturer. The conical distributing hub is one of these modifications; and where it is used, special drum deflectors and baffles are required, along with the use of all short vanes in the inner cone. In a few special cases the inside drum cone liners have been extended down to eliminate oversize in the fines. Drives from the motor to the separator shaft are V-belt or through a single reduction speed reducer with couplings. Motors used are 100 or 125 hp., although some plants are finding 125 hp. best suited for the job. Inlet pipes for hot air are usually 24 in. and exhaust pipes are 18 in. Some installations have been made using large sizes up to 32 in. for the inlet pipes.

One matter of importance in new and large systems will be the capacity of a single air separator. With an even larger mill to do the grinding. classifier capacity could become significant. In Table I the production rates attained with the various mills show a maximum of 67 t.p.h., using a 16-ft. dia. air separator. This plant

(*Continued on page* 156)

new kiln, mill, mine prime factors in

Columbia Cement's Latest Expansion

By BUREN C. HEROD

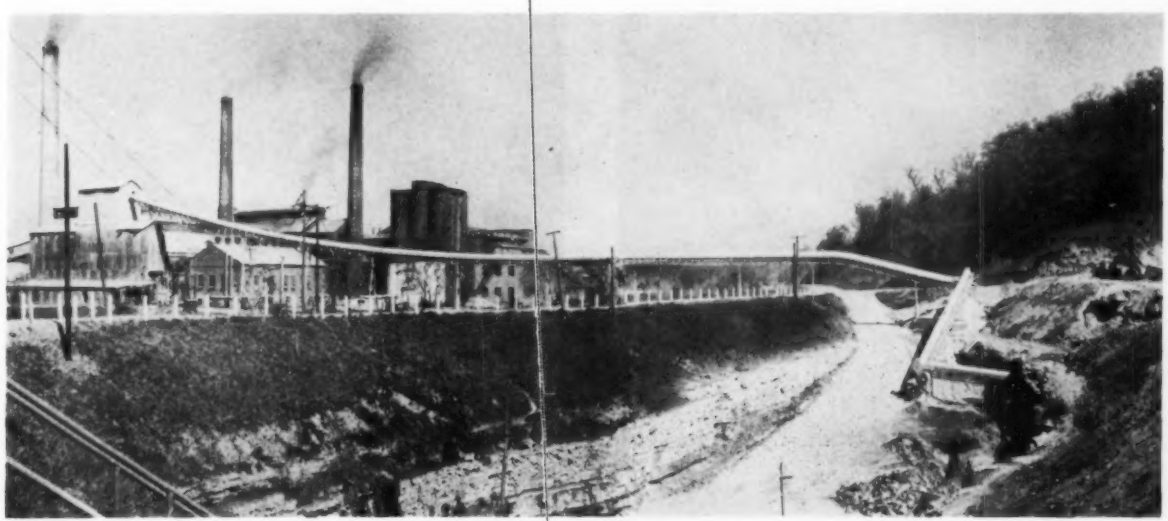
ANOTHER ON THE SPOT REPORT

THROUGHOUT its 38-year history since its origin as a quarry operation supplying a chemical market, the Columbia Cement Division of Pittsburgh Plate Glass Company at East Fultonham, Ohio, has recorded a number of projects, many of which were among industry "firsts," in its growth to its present annual capacity of approximately 3,000,000 bbl. Latest of these projects was one which involved most phases of the entire process, including a new underground mine, slurry basin, 450-ft. kiln, finish mill, and power supply.

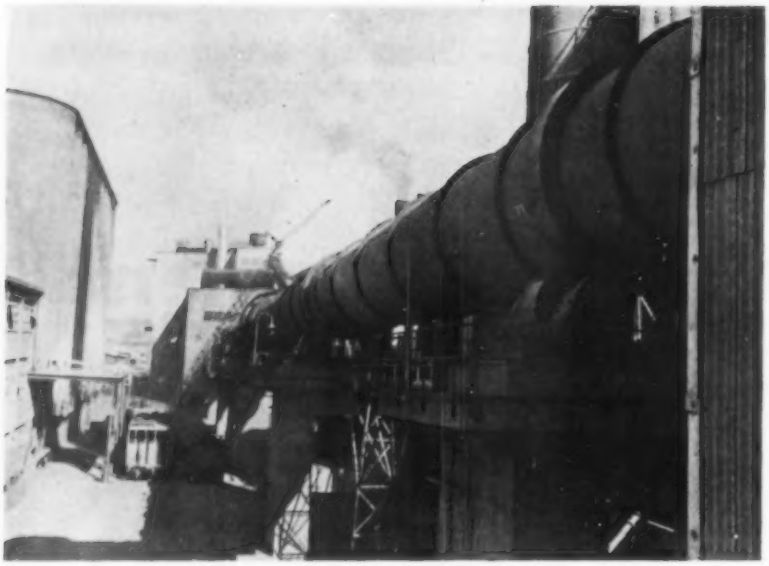
This recent program, which actually started in 1950 with the preliminary development of the new underground mine and was completed with the initial operations of the new kiln and finish mill late last year, had its inception in the constantly increasing market demands of the area served by the plant. Because of the expectation of management that the demand curve will continue to rise, particularly in view of the accelerated highway program, and also due to the trend toward more precast concrete units, the recently completed program was designed to provide a 30 percent increase in capacity at present, and a 50 percent increase if future markets should require this.

In 1919 the Columbia Chemical Company of Barberton, Ohio, (now the Barberton plant of Columbia-Southern Chemical Corporation, a wholly-owned subsidiary of P.P.G.) acquired a limestone quarry near Zanesville to supply stone used in the manufacture of caustic soda and soda ash. Those operations left fines and screenings for which there was very little demand at the time, and which posed a disposal problem due to rapid accumulation.

By 1923 the Columbia Chemical firm had been acquired by P.P.G. Investigations made by officials of the latter organization on possible uses of the screenings led to the decision to erect a 2-kiln cement plant. This decision was engendered in



This view of Columbia Cement's plant shows the underground mine entries (right) and the stone conveying system to the raw mill feed bins. The conveyor emerging from the portal is 931 ft. on centers, while that leading to the plant is 570 ft. on centers.



During the firm's latest expansion project, this 12- by 450-ft. kiln was installed as a companion unit to four older 10- by 165-ft. kilns.

large part, also, by the large reserves of shale convenient to the site and ideal for cement manufacture.

A wet process mill was established in 1924, and with the addition of two more kilns in 1926 it had reached a capacity of 5,000 bbl. a day. The latter step also involved the installation of unit coal pulverizers, reported to be the first in the cement industry. In 1928 the company became one of the first to install raw slurry filtration. In 1930 a water classification system—the second installation of its kind in this country—was made in establishing a closed-circuit raw-grind system. This was followed in 1932 with the installation of a closed-circuit finish-grind system.

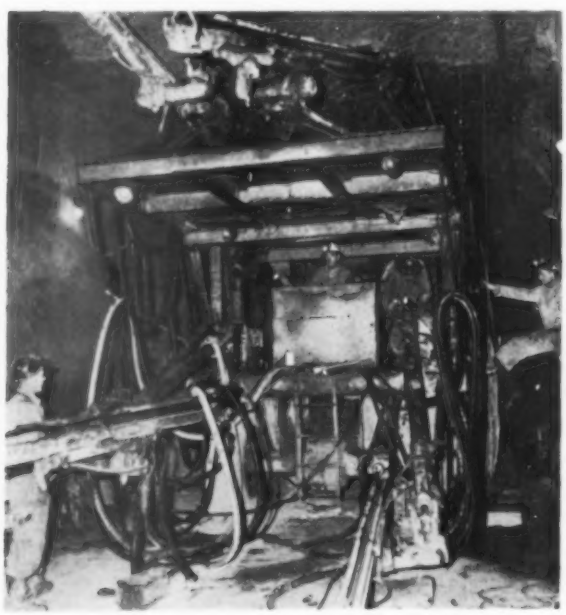
Another "first" for the industry was recorded late in 1953, when a closed-circuit television installation was made. This device allows an operator at the crusher station in the underground mine to see the view taken by either of two TV cameras—mounted on a shuttle conveyor above the raw mill feed bins—and thus by remote control to position the shuttle over the respective bins as required for filling.

Both broad phases of the recent improvement and expansion project—underground, and mill—were engineered by Columbia's own staff. Detail designing and contracting was awarded to the MacDonald Engineering Company of Chicago. While increased clinker and finish grinding capacities entailed the addition of a slurry basin, kiln, and finish mill noted previously, the existing raw mill department had sufficient capacity to meet the greater demand, and the only revision undertaken there was the conversion of the original open-circuit mills to closed-circuit with centrifugal separators.

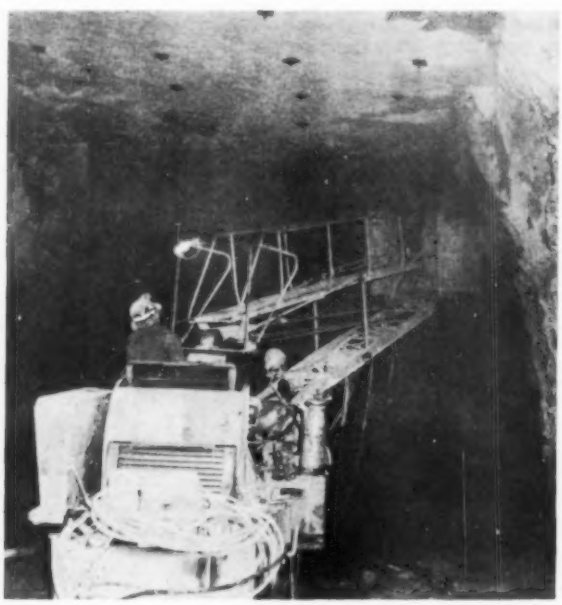
Until 1950 all stone consumed in the operation since its inception had been removed from three successive quarry operations. The last of these, the Frazier quarry, is currently nearing depletion, and while the mill's raw stone supply is now about evenly divided between the quarry and the new underground mine, the latter will probably take over the full output by the end of the year.

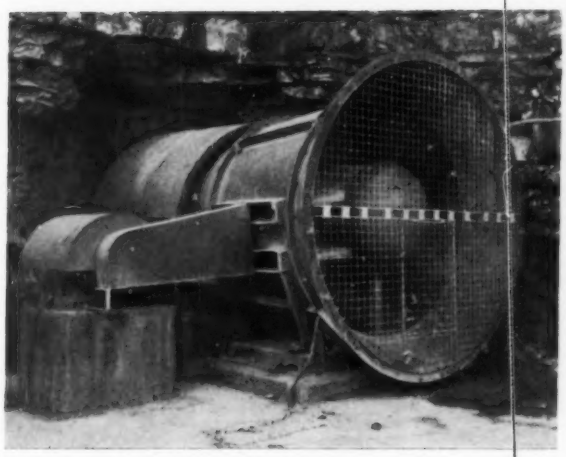
Since 1946 the company has been

Shown here is the underground shop area is one of the jumbo drilling rigs used in the mine workings.



Mounting a pantograph boom, this unit is used for scaling and bolting of the roof. Bolts and plates already installed are visible in the upper area.





This 60-in. axial vane fane supplies the mine workings with air at 85,000 c.f.m.

From this panel in the underground crusher room, one operator controls all phases of the interlocked system from the primary crusher to the discharge into raw mill feed bins. On the TV screen the operator views the material being fed to the bins as picked up by either of two cameras mounted on a shuttle conveyor above the bins.

faced with the problem of rapidly diminishing reserves of limestone which could be recovered by open quarrying in the rolling country where the plant is located. Earlier experiments with underground workings proved to be inefficient and the cost prohibitive. However, by the time it became mandatory to start mining in 1950, joint study with a U.S. Bureau of Mines team had developed a room-and-pillar system with rooms of large dimension well within safety limits on roof support, and at a greatly reduced mining cost.

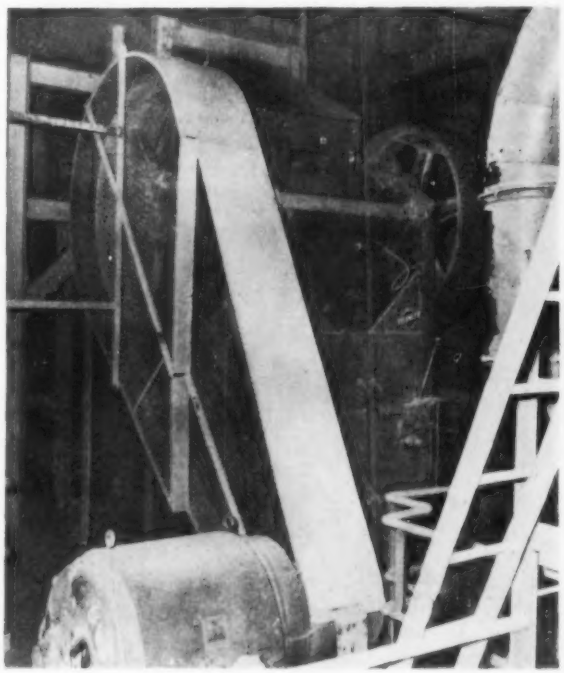
Primary development involved the driving of three main entries from a cut in the side of a hill opposite the plant. Ultimately, one of these drifts was to house the first section of a belt conveying system to the plant feed bins. Developed in the Maxville limestone, the workings are currently established within a radius of 2,000 ft. from the primary crusher. The latter, centrally located for at least the next 20 years of operation, is 1,000 ft. from the portal. Secondary crushing and screening equipment, along with the underground power control center, are also installed in that central area.

Driven on 55- centers, the rooms are cut to a width of about 28 ft., and a height of 18 ft. Pillars are about 27-ft. wide. Drilling in room development is done with jumbo rigs mounting Joy and Gardner-Denver drills with 1¼-in. steel and throw-away bits.

The normal pattern calls for about 38 holes drilled to a depth of 11 ft. in a face 18 ft. high and 28 ft. wide. These are charged with a total of approximately 250 lb. of explosive which is detonated by regular delay electric caps. The firing sequence is set up to provide shooting the center first, followed by the outer pattern. All blasting is done at night, and the development followed makes possible a 65 percent recovery of stone. Pillars left in support are about 27 ft. square.

A Hughes-Keenan rig with a pantograph boom supporting a man platform is used in scaling and bolting the roof. An electric drive is used to move the boom by remote control and diesel power is used for traveling. The Holman-type roof-bolting drill has an integral dust collector.

Loading of blasted rock from the faces is done with one of three Eimco Rocker Shovels. LeTourneau-Westinghouse 22-ton Tournarockers haul from the faces to the primary



The 42- by 48-in. jaw primary crusher in the mine. Its product has a top size of 5 in.

crusher hopper. From the hopper, the rock is transported on a 48-in. by 24-ft. pan feeder to the primary crusher. The latter, a 42- by 48-in. jaw unit with overhead eccentric, is driven by a 200-hp. Louis-Allis motor. Both feeder and crusher are Telsmith equipment. Dust collection from the primary crusher is handled by a Sly Dynaclone.

From a panel installed on a platform in the crushing station, all phases of the interlocked system, including the primary and secondary crushing, conveying sections, screening, and discharge into the plant feed bins, are controlled. Mounted on the control panel, the TV receiver—a Diamond Power Specialty Corporation Utiliscope — provides the operator with a view of conditions in the respective bins.

Primary crusher product, with a top size of 5 in., is discharged onto a short 42-in. feeder belt that transfers the material to a 30-in. by 87-ft. inclined belt conveyor. Continental Gin conveying equipment is used throughout, and United States motors provide all conveyor drives.

From the 87-ft. belt, the stone is discharged into a Pennsylvania Impactor for which drive is furnished by a 500-hp. Louis Allis motor. The product of this secondary crusher is fed to a 30-in. by 146-ft. conveyor and transported to a pair of 6- by 14-ft. double-deck screens. Both of these are Allis-Chalmers Ripl-Flo units, each fitted with 1-in. opening top deck, and ⅜-in. opening bottom deck screen cloth.

Flop gates operated by solenoid valves and air cylinders provide for chuting only the top-deck retained fraction to a 24-in. by 161-ft. belt on which it is returned to the secondary crusher, or for passing everything over ⅜-in. to the return belt.

From the screens, the minus ⅜-in. feed is transported to the plant on a series of 24-in. belts. The first of these, 931 ft. on centers, is installed in one of the three original entry drifts. At a transfer point just beyond the drift mouth it discharges onto a lateral conveyor, 150-ft. long, that carries the stone to a second transfer point above the tail pulley of the main plant feed conveyor. Transporting the plant feed at the rate of 300 t.p.h., this conveyor—570 ft. on centers—crosses a small creek separating the plant site from the hill in which the underground mine is developed.

Air is furnished to the mine by an 85,000 c.f.m. Joy 60-in. axial vane fan. Circulation is regulated through the workings by means of doors that are automatically opened or closed by the crossing of an electric-eye beam. Drilling air is provided by underground compressor stations housing 550 c.f.m. Joy compressors. All mobile equipment in the mine is diesel powered.

The mine's centrally located power center, adjoining the crusher room, is supplied with 2,300 v. Both crusher motors are operated at that voltage, while the balance of the electrical drives are provided 440 v. from the transformers. The power panel, as well as the control panel, are Square D equipment.

Shale used in the process, although formerly provided by a company operation, is now purchased and delivered to the plant by truckload. Either the new conveying system, or an inclined belt from a secondary crusher house where the quarried stone is processed, may be used to deliver the shale to the feed bins.

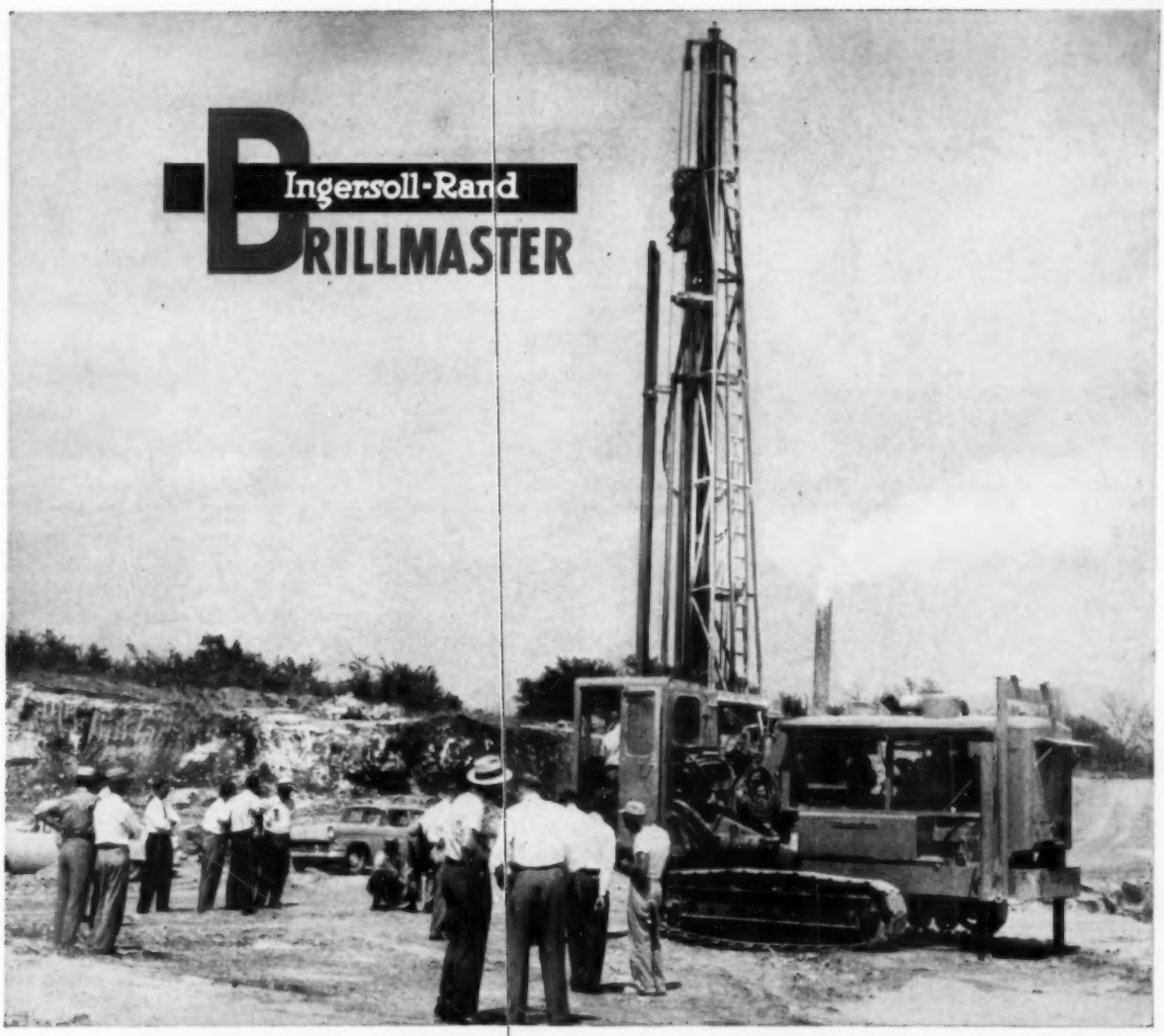
The five raw mills, as noted previously, already had the capacity to meet requirements of the expanded burning and finish-grinding operations. Two of the mills operate in closed circuit with Centriclones, and two with Dorrclones, while the product of the fifth mill may be diverted to either set of classifiers. Classifier discharge from the Dorrclones, at about 35 percent moisture, is pumped to blending tanks; and that from the Centriclones, at 50 percent moisture, is pumped to a thickener. Both classifier products contain 85 percent of solids minus 200-mesh. After thickening, the Centriclone product is pumped to the blending tanks. Raw-grinding circuits are closed with classifier tailings being returned to the respective mills.

In addition to the older correction tank from which the original kilns are fed, a 5,000-bbl. capacity slurry basin was provided in the recent program, to feed the new kiln. Constructed of thin shell concrete, wrapped with prestressed wire cable which was then sealed, the new tank is about 26-ft. high and has a 50-ft. diameter.

While the feed system for the first four kilns consists of pumping slurry to 14- by 14-ft. Oliver filter drums and feeding the resultant 17 percent

On the inclined conveyor (foreground) the primary crusher product is transferred to the secondary hammermill-type crusher (lower center).

Secondary crusher product is screened in closed circuit with these two (back-to-back) double-deck units. Minus ⅜-in stone passing the lower decks is conveyed to the plant.



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The performance of the Ingersoll-Rand Drillmaster shown above, in the quarry of a large midwest lime producer, has resulted in the sale of five additional units – to other operators who came, saw and were convinced.

This completely self-contained and self-propelled blast hole drilling rig has been in operation for over a year. Using an I-R "down-the-hole" drill and 6½" Ingersoll-Rand Carset Jackbits, sinking 60-ft holes with 18-ft spacing and 24-ft burden, this Drillmaster has consistently maintained a drilling speed of 25 feet of hole per hour, including moving time. Bit life in this dense, hard to drill limestone has exceeded 6,500 ft.

If you're interested in cost-cutting *performance*, see the Drillmaster in action. We will be glad to arrange for a visit to an operating unit – and to help you evaluate its performance in terms of your own drilling conditions. Ask your Ingersoll-Rand representative or write for further details today.

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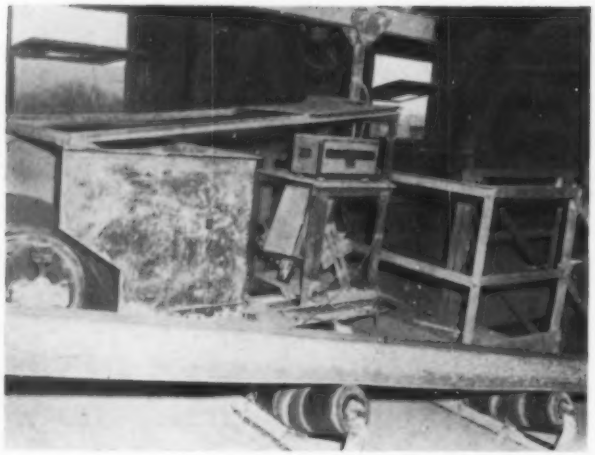
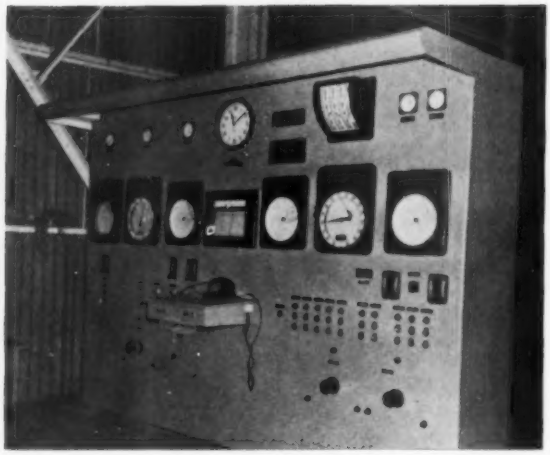
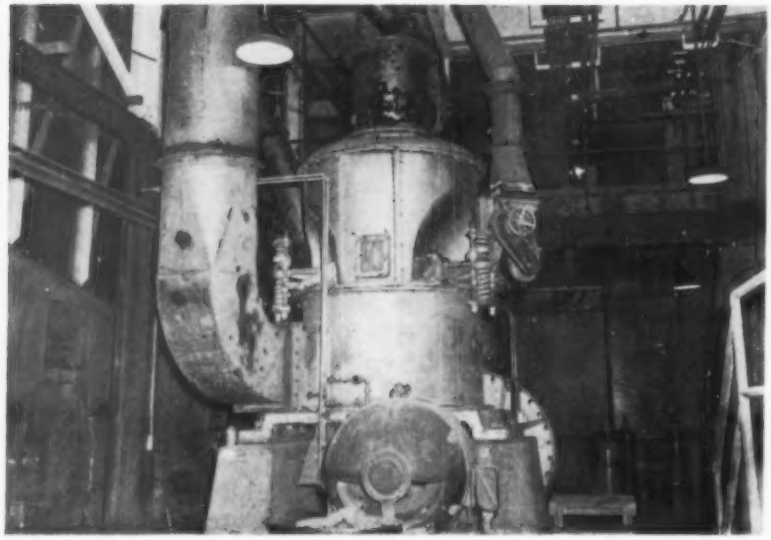


Above: One of the two TV cameras (center), mounted on the shuttle conveyor that supplies the feed bins, takes the view seen by the operator at the control panel.



The control panel, with operating and recording instruments for the new kiln.

The 5,000-bbl. slurry basin, constructed during the recent expansion program.



Pulverized coal for firing the kiln is supplied by this unit. At the left is the new 7- by 50-ft. inclined grate clinker cooler. The coolers with the older kilns are rotary units.

moisture filter cake to those kilns, the new kiln is fed a slurry by a ferris wheel feeder. All slurry in either system is transferred between tanks and from tanks to filters or feeder by Morris or Wilfley 4-in. pumps.

Peak capacity realized from the four older 10- by 165-ft. kilns has been 1,500 bbl. p.d. for each. The new 12- by 450-ft. Allis-Chalmers kiln has a normal clinker output of 4,000 bbl. daily, although this figure can be increased to 4,200 bbl. Along with the older kilns, the new unit is fired with pulverized coal provided by a Raymond coal mill. Ohio coal, purchased under a contract including bonus and penalty clauses relative to an 11,500 B.t.u. basis, is fed to the mills.

Riding on six tires, the new kiln is turned at about 70 r.p.h. with drive from two 100-hp. Allis-Chalmers motors. Due to a steel shortage on the East Coast at the time the order was placed, the sections of the kiln shell were fabricated and shipped from the West Coast.

Burning zone temperature of 2,700 deg. F. is maintained with a 250-hp. Sturtevant induced-draft fan providing air at 165,000 c.f.m. Due to its slurry feed, the new kiln is equipped with an Allis-Chalmers chain system for the first 75 ft. from the feed end.

Exhaust gases leaving the feed end of the new kiln, at about 500 deg. F. are drawn through a Western Precipitation Multiclone dust

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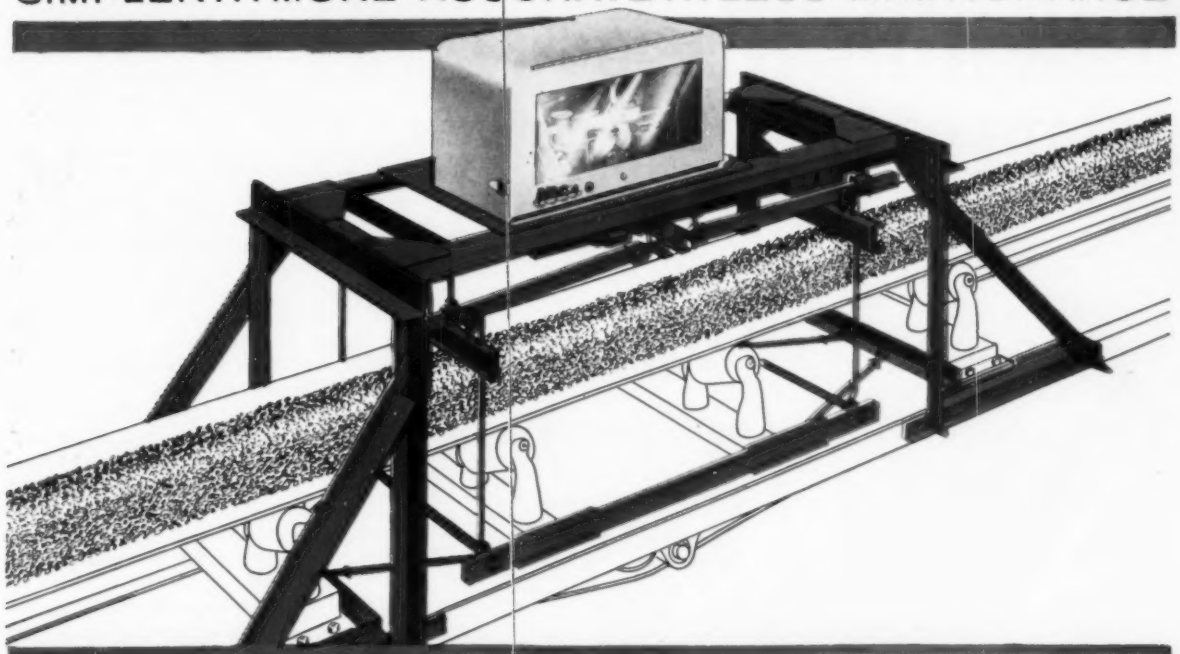

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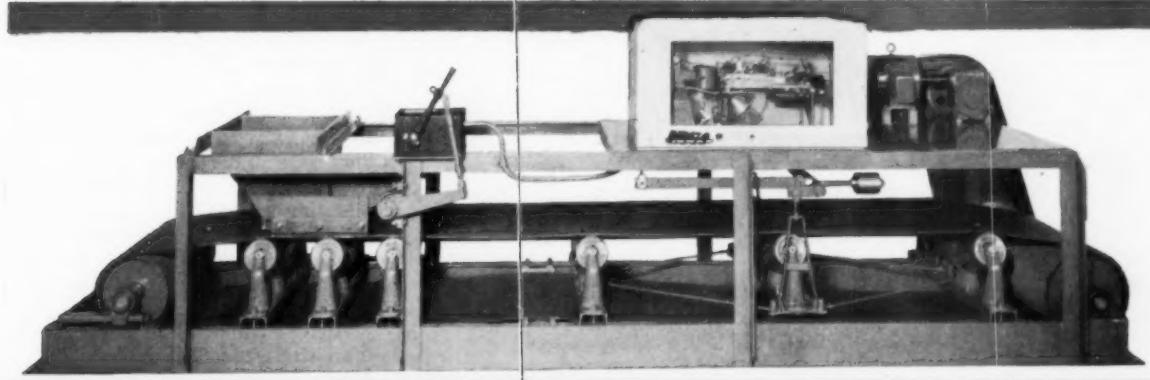

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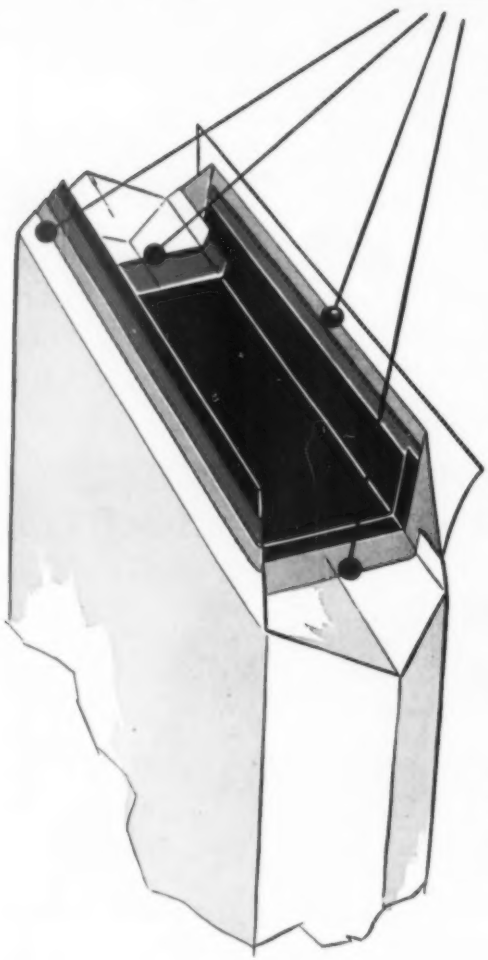

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collector prior to entering the 11- by 220-ft. M. W. Kellog concrete brick-lined stack. Dust dropped out of the exhaust gas stream is reclaimed from the dust collector and conveyed to the kiln's slurry feeder.

Clinker discharged from the four original kilns is cooled in 8- by 80-ft. rotary units. That from the new kiln is discharged to a 7- by 50-ft. Fuller inclined grate cooler. Driven by a 25-hp. motor, the later cooler is fitted with both forced and induced-draft fans providing 77,000 and 78,-340 c.f.m., respectively.

Transferred from the cooler by bucket elevator, the clinker from the new kiln is discharged into a feed bin supplying the new finish mill. In the older companion system, finish grinding is a 2-stage operation involving both preliminary and finish mills. The new circuit has one milling unit—an 11-ft. 3-in. by 17-ft. single compartment Allis-Chalmers mill—charged with 84 tons of 1- to 3-in. balls.

With power provided by a 1,250-hp. Electric Machinery synchronous motor, the mill operates at about 17.3 r.p.m., and has an hourly capacity of over 160-bbl. of cement. The closed circuit includes a 16-ft. Sturtevant air separator, from which the tailings are returned to the mill, and a 20,000 c.f.m. Norblo bag-type dust collector. With 98.5 percent passing a 200-mesh screen, the finished product, including collected dust, is transported to storage silos by a standard Fuller-Kinyon cement pumping system. The flexibility of the latter allows for pumping from either the older or the new finish milling circuits to either of the two silo groups.

Along with standard bagging operations in each of the two packhouses, facilities are provided for bulk loading of rail cars and trucks. Approximately 60 percent of the production is air-entraining cement, with the balance comprised of portland, high-early, water-proofed, and mortar cements.

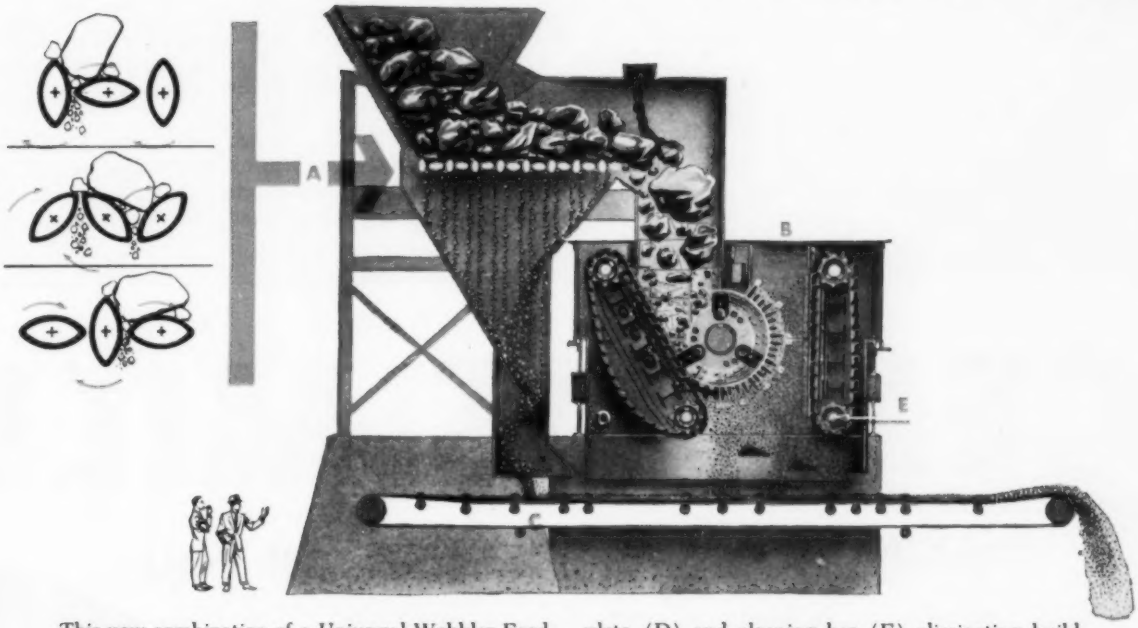
For many years, most of the Columbia plant's power requirements have been met with its own powerhouse. With waste heat boilers, steam turbines, and generators, about 135,-000 kw.-h. has been produced in a 24-hour period. Power for the recent installations is drawn from a new 69,000 v. sub-station supplied by a power utility.

Until the older quarry, which still provides a part of the required stone, is fully depleted, and the older

(*Continued on page* 155)

new feeder-hammermill combination

makes possible 50 to 100% capacity increases



This new combination of a Universal Wobbler Feeder (patented) and a Bulldog Hammermill was engineered for one of the world's largest cement mills to average 600 tons per hour. Here's how it works . . . here's why it can boost capacity for you.

The Universal Wobbler Feeder (A) feeds the Bulldog Hammermill (B). Elliptical-shaped Wobbler bars are set in alternate vertical and horizontal positions to form the feeder bed. Turning of the bars imparts a rocking, tumbling motion to the load. Mud and clay are worked loose, fines sift through bars and drop to under-conveyor (C) oversize is delivered to the Hammermill. Wobbler operates on 15 to 25 h.p.

Bulldog Hammermills feature a traveling breaker plate (D) and cleaning bar (E) eliminating build up of material in breaking chamber. Regardless of moisture, a Bulldog Hammermill keeps your crushing operation going without clogging or jamming in wet, sticky material.

This is why you can increase your production up to 100%. The Wobbler Feeder sends only oversize to the Bulldog Hammermill. Thus, the Bulldog can handle more loads per day, produce more finished material. And you get double non-clog protection by the scalping effect of the Wobbler Feeder and the non-clog moving breaker plate on the Bulldog Hammermill.

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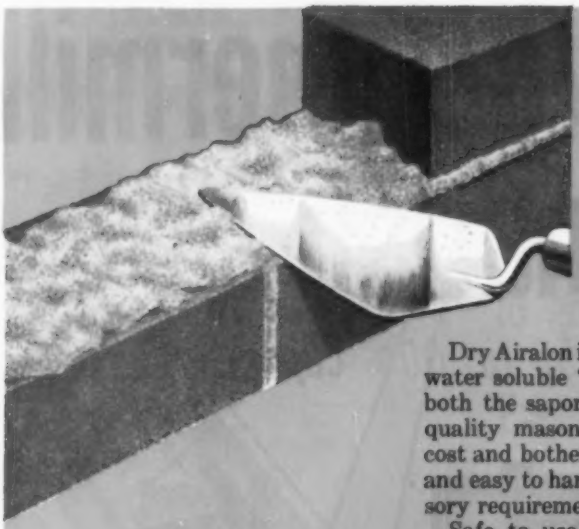
- CONVEYORS
- SCREENS
- BINS



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Dry Airalon is a highly efficient mixture of resin and fatty acids in convenient, water soluble "dry-chip" form. It contains, in one ready-to-use compound, both the saponified resin acid and fatty acid required to manufacture high quality masonry cement. "Two-in-one" Dry Airalon thus eliminates the cost and bother of proportioning these two materials separately. Inexpensive and easy to handle, it further helps maintain cost control by reducing supervisory requirements as well as plasticizer costs.

Safe to use because it requires no causticization, Dry Airalon can be counted on to provide consistently uniform air entraining effectiveness. It makes possible greater plasticity and water retention at a given air content . . . or greater strengths at a given plasticity and water retention.

CEMENT MILL

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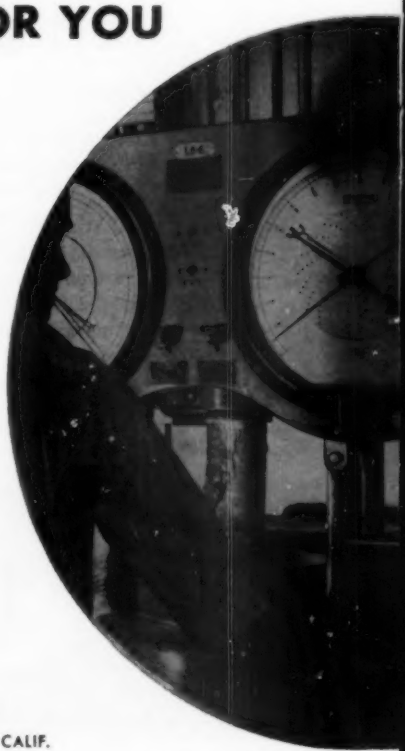
It's not by chance that Dewey and Almy cement mill products set the additions standard for quality and performance. Each product had its beginning in the world's finest privately-owned cement and concrete laboratories.

Since 1932 these laboratories have been the scene of untiring research. Here are probed many aspects of the chemistry of cement and concrete. Here it is possible to duplicate nearly every conceivable cement mill or construction situation. Thus, the research is *utterly practical.*

Our products—Airalon, TDA, MTDA and MRDA among them —are presented to the trade by field men whose knowledge and technical skill are among the best in the industry.

Cement mill production men rely on these products for uniform quality and for performance that matches specifications. Contractors and builders also value these products in their cement usage . . . further proof that research that begins in the laboratories pays off *on the job.*



DEWEY AND ALMY
CHEMICAL COMPANY
DIVISION OF W. R. GRACE & CO.

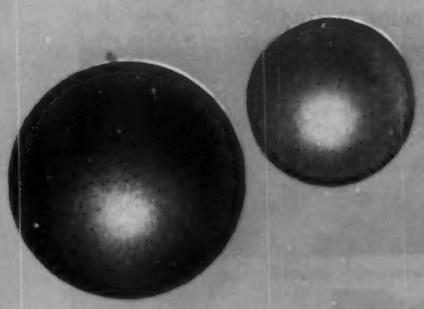
CAMBRIDGE 40, MASS. • MONTREAL 32, CANADA • CHICAGO 38, ILL. • SAN LEANDRO, CALIF.

FOR LOW-COST AIR-ENTRAINING CEMENTS DRY AIRALON

When low-cost air-entraining cements are the order of the day, Airalon is the answer. This multi-purpose compound, easily added as a solution or a dry compound, simplifies inventories, proportioning and handling. Dry Airalon is specially processed in coarse, chip-like form to eliminate hanging-up in feeder bins or hoppers, and permit easy proportioning by means of dry feeders. Dry Airalon "chips" are shipped in protective polyethylene-lined bags—double protection against warehouse caking.

Accepted by ASTM for use in making air-entraining cement in accordance with ASTM C-175, Dry Airalon requires no causticization.

STANDBYS



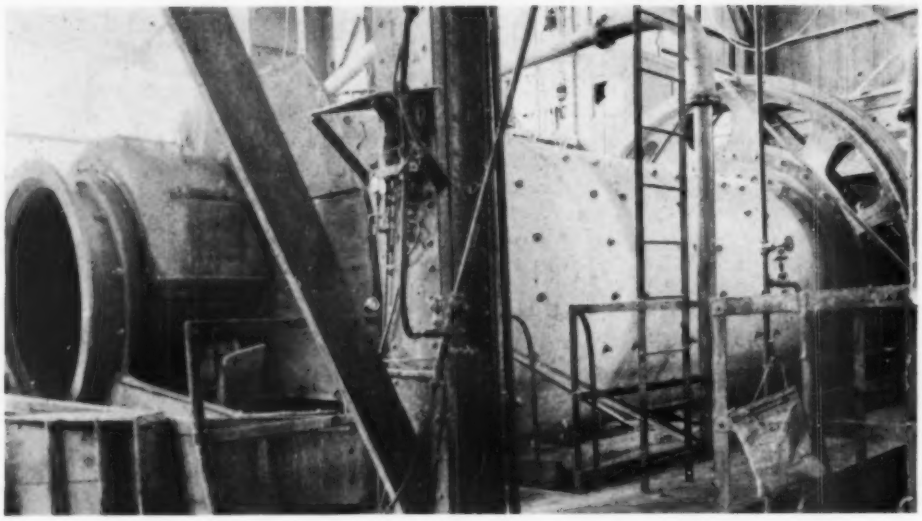
FOR MAXIMUM GRINDING MILL OUTPUT TDA and MTDA

TDA and MTDA, Dewey and Almy's twin cement mill products, normally increase mill output 10 to 50% (depending on fineness) even when grinding media are as clean as those pictured here. Where ball coating is encountered, TDA and MTDA furnish even greater grinding assistance.

Because hanging-up in the separators is reduced and dry dispersion improves separator efficiency, TDA and MTDA provide a supplementary increase in closed circuit grinding output.

see what Marcy can do for YOU!

Grinding Cement

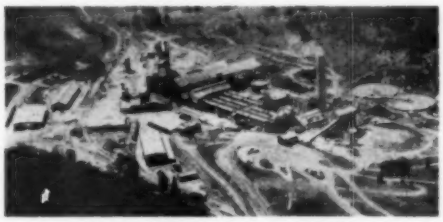


One of the most progressive cement companies, the Calaveras Cement Company, has for twelve years benefited from the use of Marcy grinding equipment. During its continuing growth and improvement of operations additional Marcys have been selected...to date nine Marcy Ball Mills have been installed.

Pioneering in cement grinding work has left Calaveras open minded and, as a result, recently a *9' x 12' Marcy Open End Rod Mill* was installed for *clinker* grinding work. This deviation from common practice has paid dividends. Not only is pit run clinker economically reduced to about 2% +8 mesh, 100% —4 mesh in open circuit, but also the finer, finish grinding circuit has been increased in capacity as a result of better, finer feed preparation through use of the Marcy Rod Mill. No longer is tramp oversize a problem. The ultimate potential of this 9' x 12' Marcy is still not determined...to date better than 500 bbls/hour are being ground.

Such advantages as the above, coupled with the years of manufacturing, pioneering and development experience offered by Marcy are yours

...why not get the full story on grinding?



Calaveras Cement Company Plant

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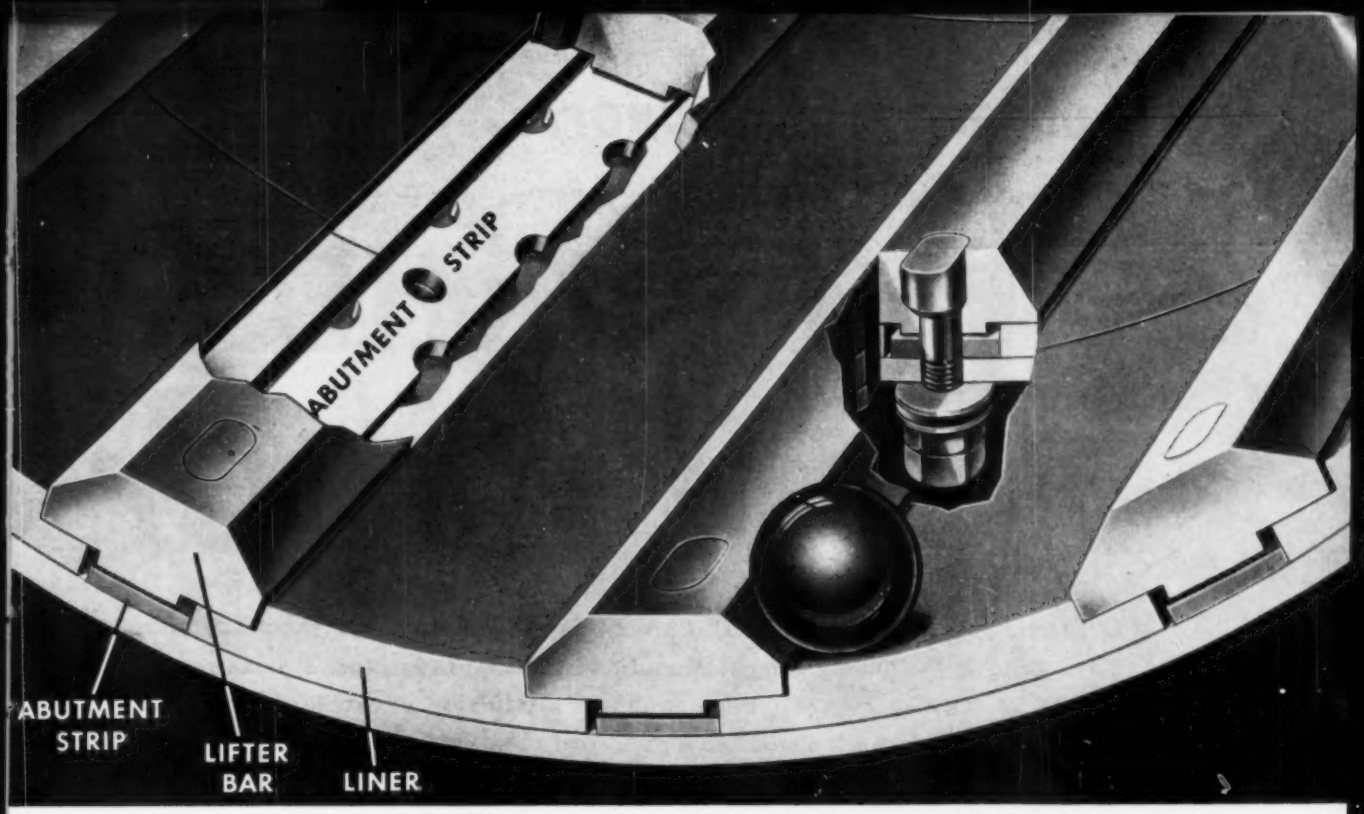


New liner saves cement mill wear

Here's KENSINGTON's latest triumph in its *War Against Wear* . . . the new ORO-LOK Lining for cement grinding mills.

By combining superior, wear-resisting materials and improved design, this revolutionary new lining successfully overcomes the most common causes of wear, breakage, and excessive maintenance.

Briefly, here are just a few of the important improvements:

Patented, welded-on abutment strip reinforces shell at location of bolt holes.

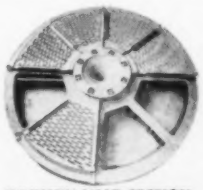
Bolts seldom loosen. In conventional linings, shocks and blows set up a shearing stress which causes bolts to loosen and break, thus requiring frequent, regular, and costly servicing. As seen above, ORO-LOK design *completely eliminates* this common cause of trouble because liner plates butt against abutment strips which absorb all lateral stress. Bolts are subject to tension only.

OROLOY lifter bars outlast others. OROLOY is a special super-hard, super-tough alloyed high-manganese steel. Not only is it hard to begin with, but it *actually fights back against wear* by developing even greater surface hardness when subjected to impact of balls. You can expect OROLOY Lifter Bars to last as long as the liner itself . . . and when necessary, they can be easily renewed or reversed without disturbing rest of the lining.

Needs no grouting-in. Since not enough abrasive material can enter behind plates to cause serious scouring, there's no need for zincing or grouting-in.

For more information on the new ORO-LOK Lining and how much it can save *you*, phone or mail coupon today. You'll be under no obligation.

Other wear-resisting KENSINGTON replacement parts:



DIVISION HEAD SECTION
for grinding mill has exclusive design features which greatly prolong service life.

SCREENS, GRATES, LINERS
and other alloyed manganese steel replacement parts fit all standard cement mills.

CHAINS, SPROCKETS
150 different standard chains and sprockets plus many special models . . . all of wear-defying KENKROME.

KENKROME ELEVATOR BUCKETS
for outlast ordinary fabricated buckets wherever abrasion and impact are important factors.

Kensington STEEL

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DIVISION OF POOR & CO., CHICAGO

☐ Please send more information on ORO-LOK Lining.
☐ Please quote prices.

Description of mill: Make_____

Model_____ Present Liner Thickness_____

NAME_____

COMPANY_____

ADDRESS_____

CITY_____ ZONE____ STATE_____

On their way to deliver...

Full Rated Year After

On the record, B&W Type EL Pulverizers — like these five shown prior to installation at Whitehall Cement Manufacturing Co., Cementon, Penna. — have established outstanding records for sustained production in extended continuous service. They have consistently delivered full rated capacity year after year for substantial savings to many individual companies.

Some of the reasons for this record of highly efficient, economical rotary kiln firing with wet or dry coal of widely varying grades, include:—ball-bearing grinding . . . heavy duty construction . . . low maintenance . . . automatic pressure lubrication . . . closely controlled rate of delivery of uniformly fine coal to burners, regardless of wear of grinding elements . . . high availability . . . low power consumption.

On the record, for uniform performance in the direct-firing of any type or size of rotary kiln, you can depend on B&W Type EL Pulverizers. The Babcock & Wilcox Company, Boiler Division, Process Equipment Dept., 161 East 42nd Street, New York 17, N. Y.

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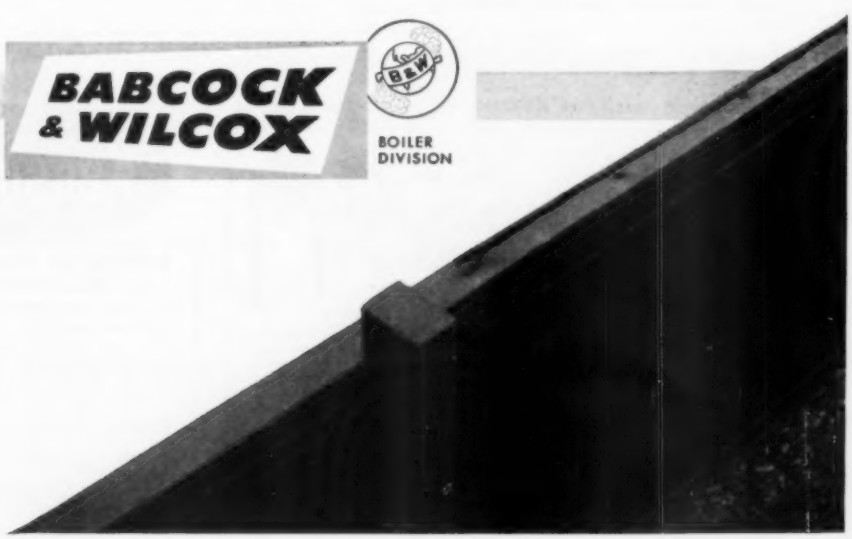


C-209

Capacity Year

Interior of a Hardinge 11½′ x 12′ Rod Mill with 85-ton rod load, 1000 horsepower.

Hardinge
ROD MILLS

Sizes range from 2′ to 11½′ shell diameter and up to 1000 horsepower.

Types include trunnion overflow and peripheral discharge for both wet and dry grinding.

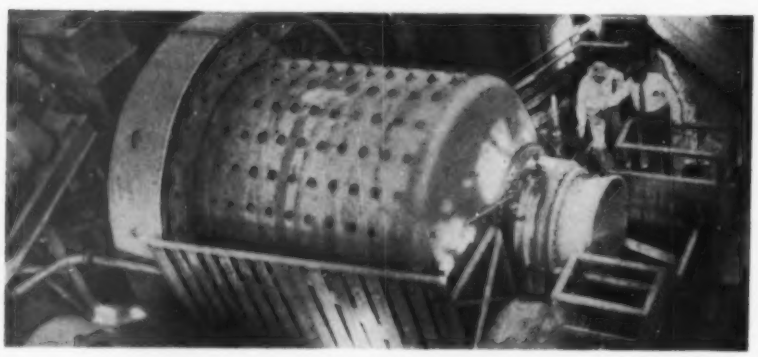
Applications include both open and closed circuit arrangements for ores, aggregates, concrete sand, cokes, and abrasives.

Complete specifications on request. Ask for Bulletin AH-438-8.

Trunnion overflow mill

End peripheral discharge mill

Center peripheral discharge mill



Exterior of 11½′ x 12′ Hardinge Rod Mill shown above

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COMPANY, INCORPORATED

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Peerless' New Plant

(*From page* 118)

ft. Allis-Chalmers ball mills is driven at the rate of 18.2 r.p.m. by a 1,000-hp. General Electric 240-r.p.m. synchronous motor. The mills have Lorain plate liners, and each is loaded with 150,000 lb. of forged steel balls ranging in seven sizes from 4-in. down to 1-in., with 1½-in. predominating. These mills also are loaded to 40 percent of their volume. The product of each mill is taken by a 14-in. Fuller-Huron Airslide, a bucket elevator, and another Airslide, in series, to a 16-ft. Sturtevant separator. Tailings from the separator are returned to the feed end of the mill by another Airslide.

Each separator is cooled by means of two Norblo dust collectors, which are under suction from one 20,000-c.f.m. Norblo No. 80, Type HS fan. The fans exhaust to atmosphere. The collected dust is returned to the elevator in the mill stream ahead of the separator, and the finished cement is discharged from both separators at a temperature of 180- to 190 deg. to one 7-in. Fuller-Kinyon pump. Each of these mills and the raw mills has a Farval manual lubricating system.

When portland slag cement (Type I S) is being made, a blend of 42 percent dry water-granulated slag, 54 percent clinker and 4 percent gypsum is used. Grinding is done finer than with standard portland (about 3,500 sq. cm. per gm. Blaine) in order to get approximately the same strengths at the early ages. Production is about 72 bbl. per hr. of slag cement from each of the two mills. The output of standard cement is about 125 bbl. per hr. with a fineness of 1,700 sq. cm. per gm. Wagner (2,900 to 3,000 Blaine).

Cement Storage The cement is pumped 720 ft. through an 8-in. line to the storage, which consists of eight concrete silos in two rows; these, with their three interstices, have a total capacity of 160,000 bbl. The silos are 32 ft. I.D. and 133 ft. 6 in. high above ground level, and have conical self-cleaning bottoms. Bulk loading is done direct into cars or trucks on scales under the silos. Under one row there are tracks and two 300,000 lb. capacity Fairbanks automatic track scales. Under the other row are two 120,000-lb. Fairbanks automatic truck scales, with 60-ft. platforms. Trucks can be loaded under either row. Loading is done through Airslides and drop spouts and is con-

(*Continued on page* 156)

At the left in this overall view of the new Louisville Cement Co. crushing and screening installation is the primary crusher building. The next building houses the scalpers and the secondary crusher. The impactors and final screens are installed in the third. At the right are the quarry stone storage bins.

Louisville Cement

doubles crushing capacity during general expansion

By BUREN C. HEROD

ANOTHER ON THE SPOT REPORT

DURING its long history, dating back nearly 90 years, the Speed, Ind., plant of the Louisville Cement Company has witnessed many changes in the cement industry of the area in which it is located, and has itself undergone several modifications. Of the latter, the most recent project involved complete relocation of the crushing and screening operations from the plant to the quarry site. The impressive new installation and equipment, designed to produce 600 t.p.h. of crushed screened stone for feed to the plant, has double the capacity of the former crushing and screening facility.

Described as the largest cement mill in the world at the time it was built—in 1869—the original Speed operation was one of 18 cement producers in southern Indiana and the Louisville, Ky., area that accounted for about 25 percent of the annual cement output in this country during the 1890's. The Speed plant is the sole remaining producer of that group.

Until about 1905 the product manufactured by Louisville Cement and its contemporaries was natural cement—much of the available limestone in the area being of ideal composition for such use. However, the management of this firm recognized the potential in the then new portland cement, and as a result Louisville Cement was among the first in that section to install equipment for production of that material early in the century.

Since that time, a number of modernization programs have been completed in keeping with the industry's technological changes. The recent revision of the crushing and screening operations represents the end of one cycle and the beginning step in a second cycle of plant expansion in a program that was initiated in 1946 and will be completed in 1959 or 1960. Since 1948, the replacement of older units with three new kilns has raised clinker capacity by approximately 60 percent. In order to balance the latter, additional capacity has been added to all phases of the operation—the recent crushing expansion, raw and finish grinding, silos and packing, and electric power distribution.

The installation of a 390-ft. kiln in 1958—that will replace two older and smaller units—will substantially revise the present annual portland cement capacity, of about 3,000,000 bbl., upward toward the goal of 3,500,000 bbl. With the exception of rock crushing and screening, and raw grinding, the capacity of all phases will again be increased during the program's second cycle in progressing toward that goal. Due to the transfer of the stone crushing and screening department to the quarry area, the area formerly required at the plant for that phase was made available for the current expansion of the raw mill department.

As noted previously, the major portion of the most recent developments in the general expansion program was related to moving and expanding the crushing operations. Along with the increase in capacity of stone production and the use of the former crushing area for replacing and enlarging the raw-grinding facilities, the transfer of the crushing operation to the quarry has centralized the latter two phases, resulting

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This dependable line of heavy machinery has long been recognized throughout the cement, aggregate and construction industries for maximum, continuous production of big tonnages at lowest possible cost . . . including Symons® Gyratory and Cone Crushers for primary and fine reduction crushing; Symons Vibrating Grizzlies and Screens for scalping and sizing; Grinding Mills for wet and dry grinding; Kilns and Coolers; and a complete line of Nordberg Engines from 10 to over 12,000 horsepower to meet practically all power requirements.

Write for literature on the Nordberg Machinery you need to efficiently produce large tonnages of quality cement, aggregate and sand to meet the most rigid specifications.

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Q156-R

Typical of today's modern highway construction is this view of the new Freeway in Oakland, Calif., showing 3 levels of highway structure over 2 levels of railroad.

(Photo courtesy California Division of Highways)

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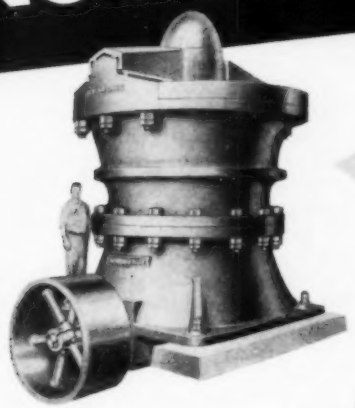
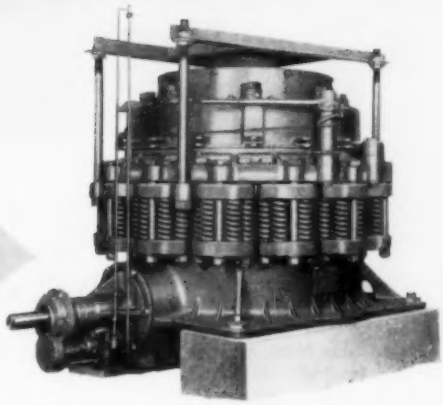
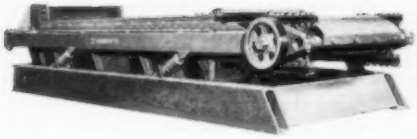


SYMONS® GYRATORY and CONE CRUSHERS

Gyratory crushers built in sizes from 30″ to 72″ feed openings, for capacities up to 3500 or more tons per hour.

Cone crushers built in Standard, Short Head and Intermediate types, in sizes from 22″ to 7′, in capacities from 6 to 900 or more tons per hour.



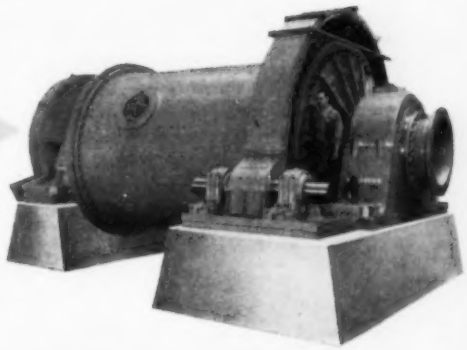


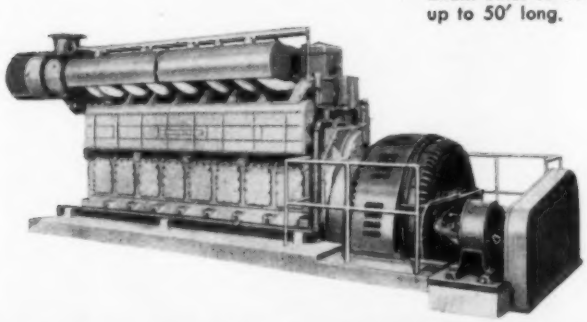
SYMONS VIBRATING SCREENS and GRIZZLIES

Built in a wide range of types and sizes to meet practically all requirements from heavy scalping to fine screening applications.

NORDBERG GRINDING MILLS

Include ball, pebble, tube, rod and compartment types for wet or dry, open or closed circuit operation. Sizes to 13′ diameter and up to 50′ long.





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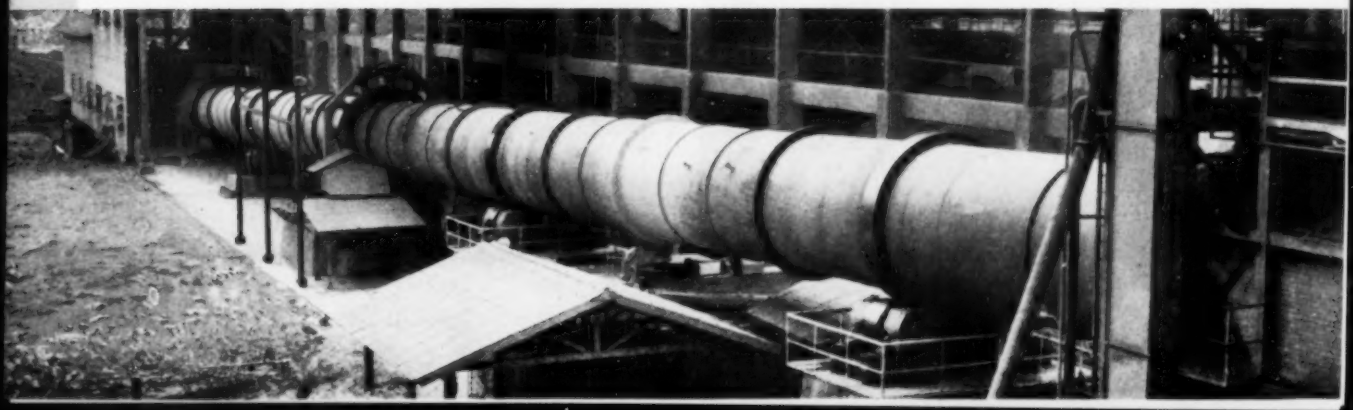
Built in a wide range of sizes from 10 to over 12,000 horsepower, including Diesel, Duafuel® and Spark-Ignition Gas types for low cost power generation.

ROTARY KILNS

Nordberg Kilns, Dryers and Coolers are built for pyro processing operations, calcining, burning and cooling.



When the dump body of the haulage truck is fully raised, it cuts an electric-eye beam and is automatically recorded on a counter at the control panel.

in a natural gain in efficiency. One operator at a control panel located in the primary crusher house has pushbutton control over the entire interlocked system, from the primary crusher to the distribution into storage bins from which haulage trains are loaded.

Situated about a mile from the plant, the quarry covers an area approximately a mile wide. Stone has already been removed from about 200 acres, but sufficient reserves are available for production far into the future. The deposit is an interesting occurrence from an economic and production standpoint—being one from which all facies of the formation lend themselves to profitable exploitation.

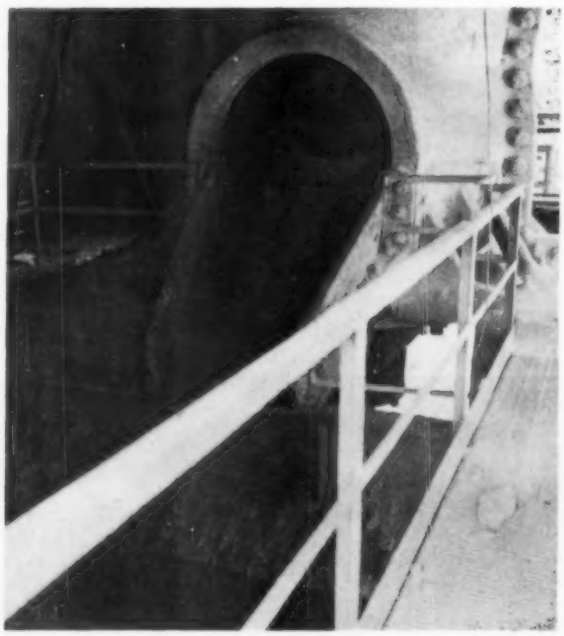
Immediately below a thin overburden of top soil is a ledge of natural cement rock averaging 10 ft. in thickness. This layer was actually the reason for locating the original cement mill at Speed, and it still supplies the kiln with which the company makes special products, including Brixment. Underlying that stone is a 40-ft. section from which stone for portland cement production is extracted. Below this is a ledge ranging from 2 to 10 ft. in thickness that was formerly processed by Louisville Cement into commercial materials such as aggregates and agstone. Blasted rock from this ledge is now sold to the Sellersburg Stone Company, which operates a crushing and screening plant in another section of the quarry. The commercial stone ledge is underlain by more limestone suitable for portland cement manufacture; this lower stone provides reserve for the future when the 40-ft. layer now being worked is depleted.

The upper bench of stone for Brixment production is drilled for blasting by a pair of Gardner-Denver wagon drills, and the broken stone is separately loaded for truck haul to the plant by a 2-cu. yd. Marion shovel. This material is not processed through the new crushing plant in the quarry, but transported to a crusher station at the Brixment plant.

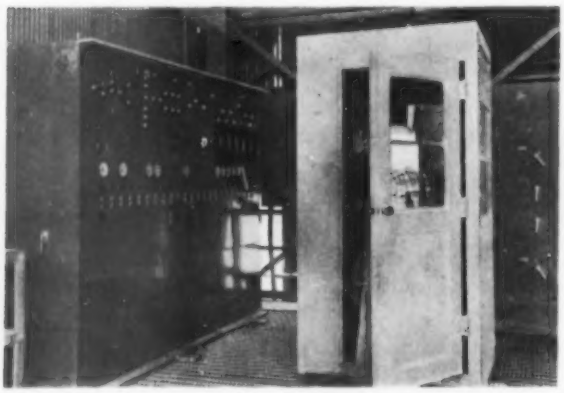
In preparing the 40-ft. stratum of portland cement stone for blasting, a Joy Champion blast hole rig is used to sink 6⅝-in. holes—about 40 to 60 per shot—in a pattern that provides a 15-ft. burden and 24-ft. spacing. Explosives used are Trojan 70 percent dynamite, DuPont Nitramon, and Nitromex.

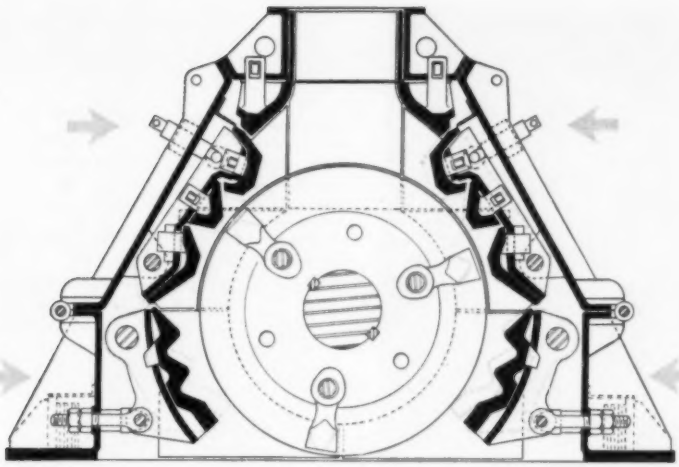
Blasting operations were revised to a minor extent from the procedure followed prior to the installation of the crushing plant in the quarry. Previously, narrow-gauge rail haulage was employed in transporting broken stone from the working face to the former crusher station at the plant site. In order to protect the trackage, buffer blasting was followed, in which the first row of blast holes was set off before the balance of the shot. The broken material from that area acted as a protective barrier between the trackage and

Right: From the gyratory, the stone drops into a surge bin, foreground, prior to being fed to the No. 1 conveyor.



Below: All phases of the crushing and screening plant, from the primary crusher to the distributing conveyor over the stone bins, are controlled from this panel in the primary crusher house.





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ADJUSTABLE BREAKER BLOCKS*
IN PENNSYLVANIA REVERSIBLE IMPACTORS

Here's another Pennsylvania original that is a great contribution to more economical and efficient crushing.

On crushers equipped with stationary Breaker Blocks, as hammers and blocks wear and the distance between the hammer tips and the faces of blocks increases, the circulating load of oversize material builds up. This not only imposes a greater burden on belts and screens, but the tonnage of the finished product drops off, calling for early replacement of hammers.

But when your Pennsylvania Impactor is equipped with adjustable breaker blocks, as the hammers and blocks wear, all you do is move the blocks towards the hammer circle—this not only gives you a constant hourly tonnage of a uniform product with little change in the circulating load, but you get many more tons crushed per set of hammers. The great developments in crushing design are still coming from Pennsylvania!

IF YOU HAVE A PENNSYLVANIA REVERSIBLE IMPACTOR WITH STATIONARY BREAKER BLOCKS, ASK US ABOUT INSTALLING ADJUSTABLE BLOCKS.

PENNSYLVANIA CRUSHER DIVISION
Bath Iron Works Corporation **West Chester, Penna.**

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cut operating costs

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assure uniform product during longer life of hammers

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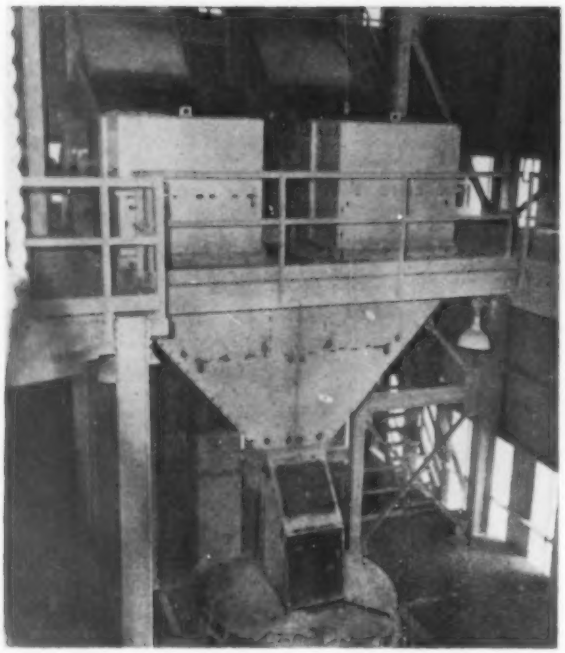
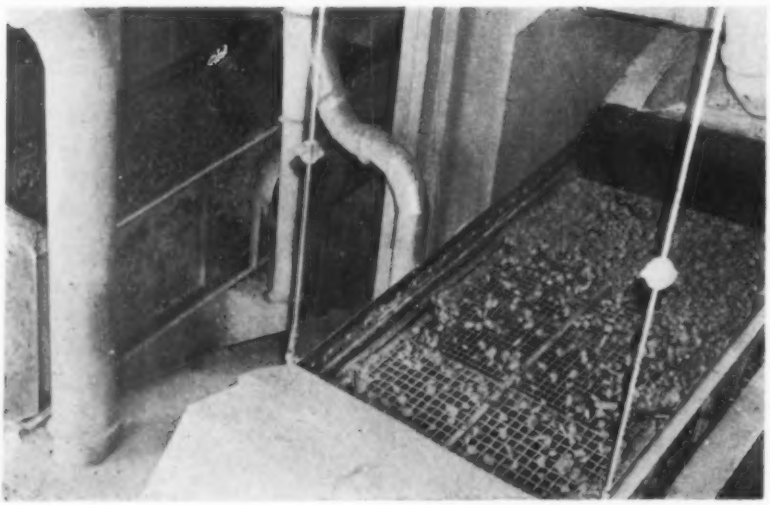
REVERSIBLE IMPACTORS

PE-251



At present, the fractions retained on both decks of the two scalpers at the top are fed to the secondary crusher below for reduction through a 1-in. setting.

Below: Final reduction is accomplished in these two impactors, each of which is driven by a 500-hp. motor.



Stone for plant feed is separated on the 1½-in. square opening decks of these two final screens. Material retained on the screens is returned to the impactors.

the blasting of the rest of the pattern. Six 25-ton Euclid trucks are now used for haulage to the new crushing plant, and the former blasting procedure is no longer followed.

A 4½-cu. ft. Bucyrus-Erie electric shovel loads the broken rock from the 40-ft. face into the haulage units. At the rate of 500 t.p.h. on one daily shift, these trucks deliver the rock to the feed hopper of the new crushing and screening plant at the north end of the quarry.

Construction of this plant was started in November, 1955, with detail design of structures and equipment layout by Allis-Chalmers based on a plan developed by the Speed engineering staff. The facility was placed in operation last November.

With steel framework and siding buildings about five stories high housing the crushing and screening phases, and a pair of 3,000-ton capacity steel storage tanks mounted on a massive concrete support comprising a loading tunnel, the installation presents an impressive picture.

Link-Belt conveyors, fitted with Goodyear belting, are used throughout the plant on approximately 1,400 ft. of conveying system. Allis-Chilmers motors—all but three of which are provided with Allen-Bradley starters—are used on all equipment in this installation. Other Allis-Chalmers components include the primary and secondary crushers, for which the manufacturer provided erection supervision, and the four screens. For final reduction, two Pennsylvania CD 1550 reversible impactors were installed.

At the primary crusher building, the quarry trucks dumping into the feed hopper interrupt a photo-electric beam as the end-dump bodies are elevated to dumping position. The interruption is recorded on a counter installed on the control panel facing the operator's booth, thus taking an automatic count of the loads dumped per shift.

The stone drops directly from the hopper into the 24K gyratory primary crusher. Drive for the crusher is provided by a 230-hp. motor. Crusher product is chuted to a surge hopper, from which it is transferred by a 600-t.p.h. capacity Hewitt-Robbins apron feeder to conveyor No. 1. An RCA metal detector installed over the belt near the feeder automatically stops the conveyor when tramp metal is detected.

More and more cement companies are turning to

CEDARAPIDS DOUBLE IMPELLER IMPACT BREAKERS

Here's Why!

5360 H DOUBLE IMPELLER IMPACT BREAKER turns out 1000 tons of limestone per hour in Kansas. Cedarapids Vibrating Grizzly, 5 Horizontal Vibrating Screens and 4 Hammermills, plus conveyors, complete the plant.

IN MONTANA, a 3042 Double Impeller is reducing wet quarry-run limestone, containing 4% silica, to ⅜" minus. The owner says "It's ideal equipment for this kind of rock."

AT A CEMENT COMPANY'S QUARRY IN MICHIGAN, a 5360 Double Impeller is reducing extremely hard quarry-run shale to 3" minus. Operating 8 hours a day, the unit requires practically no maintainance.

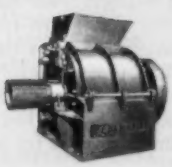
- **BIG TONNAGE PRODUCTION** . . . Up to 1000 tons per hour output meets capacity demands to supply today's expanding market.
- **HIGH RATIO OF REDUCTION** . . . 40 or 50 to 1 reduction ratio cuts production costs. Cedarapids Double Impellers, which reduce 53" diameter material to minus 3" in one pass, are often used for simultaneous primary and secondary reduction, thus reducing the need for auxiliary secondary crushers, screens, conveyors, etc., and cutting power requirements.
- **LOW MAINTENANCE COSTS** . . . With rock fed from the highest point of the unit, the entire breaking chamber is utilized for breaking rock in suspension. Incoming rock is struck and broken by rock hurled upward and outward at terrific speed by oppositely rotating impellers. There is approximately 50% less contact of stone on metal, thus reducing wear on impellers and breaker bars.
- **TRUE IMPACT ACTION** . . . The discharge opening is wider at the discharge end to eliminate any possibility of scrubbing action or pressure crushing that result in excessive wear and high power consumption. Breaking is accomplished only by impact of rock against rock and against breaker bars and impellers.

These are but a few of the many Double Impeller features that help cement companies step up output and cut production costs for crushing limestone and shale. See your Cedarapids distributor for complete details about *all* Double Impeller Impact Breakers.

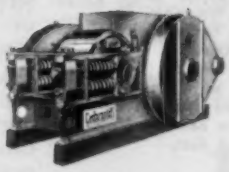
IOWA MANUFACTURING COMPANY
Cedar Rapids, Iowa, U.S.A.

Cedarapids — Built by IOWA

CEDARAPIDS SERVES THE CEMENT INDUSTRY WITH A COMPLETE LINE OF EQUIPMENT



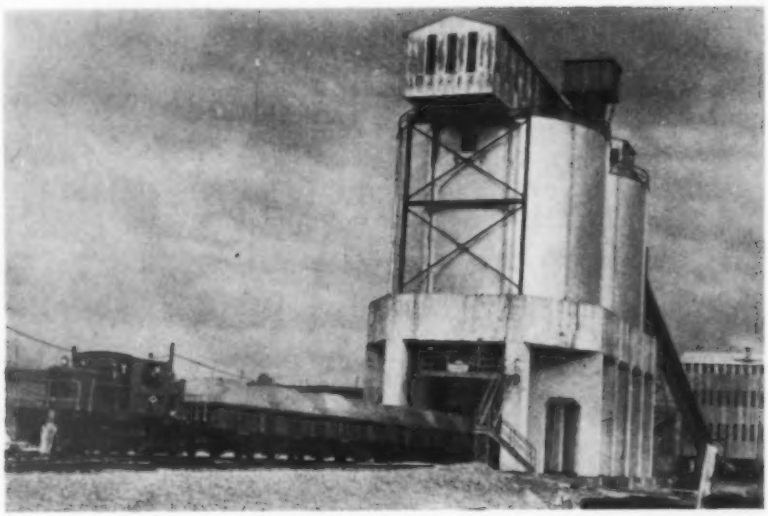
HAMMERMILLS produce a much finer quality of product, and size for size produce more tons per hour than other similar types of equipment in the market.



ROLL CRUSHERS, in 8 sizes with 3 types of roll shells, insure high capacity of the smaller size finished products you want.

HORIZONTAL VIBRATING SCREENS provide as much as 12½% greater screening area than inclined screens of the same size. Available in 3' x 8' to 60" x 16' sizes, with double or triple decks.

HEAVY-DUTY FEEDERS designed to feed big crushers with a smooth, workable flow of material, and withstand the shock of heavy dumping.



Three draw points are provided below each of these 3000-ton capacity storage tanks. Haulage to the raw mill storage is done with 12-car trains.

No. 1 conveyor, an inclined unit leading to the top of the secondary crusher house, has a 48-in. belt on 327-ft. centers. From the discharge point, the feed is split to a pair of five- by 10-ft. double-deck scalping screens. Both are fitted with 3½- and 2-in. square opening screencloth on their upper and lower decks, respectively.

Material retained on the top decks is chuted to the secondary crusher—an 84-in. Hydrocone—where it is reduced through a 1-in. setting. Provision has been made for chuting the 2- by 3½-in. fraction retained on the lower decks to a short lateral conveyor for transfer to a storage tank adjoining the secondary crusher building. At present this fraction is fed to the Hydrocone with that from the top decks. A 300-hp. motor provides drive for the secondary crusher.

The product of the latter joins the minus 2-in. fraction passing the lower decks of the scalpers on a 36-in. by 14-ft. belt feeder on which the stone is transferred to conveyor No. 3. Fitted with a 42-in. belt on 175-ft. centers, the latter carries the stone to the top of the final reduction and screening building.

Here the feed is split to a pair of Hewitt-Robins vibrating feeders, each supplying one of the two reversible impactors. Each of the latter, driven by a 500-hp. motor, discharges to a 6- by 16-ft. single-deck screen. Both of the final screens are fitted with ½-in. square opening screencloth. The stone retained on both screens is chuted to conveyor No. 4—167-ft. on centers, with a 30-in. belt—and is returned to conveyor No. 3 in closing the final reduction and screening circuit. Finished material passing the final screens is chuted to conveyor No. 5 for transfer to the storage tanks.

Dust created in the final crushing and sizing is collected by a Western Precipitation Multiclone unit fitted with a 27,000-c.f.m. fan. Material collected is fed to Conveyor No. 5, along with the screened stone.

The latter conveyor, 344 ft. on centers with a 36-in. belt, transfers its load to conveyor No. 6— A 36-in. by 136-ft. unit equipped with a Link-Belt tripper mounted above storage tanks. From the tripper, the stone is discharged into the two underlying steel storage tanks.

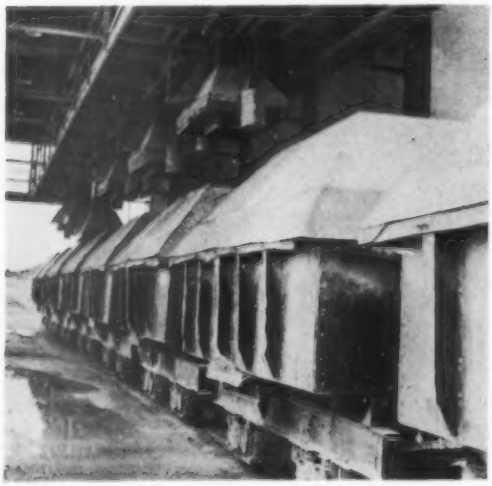
Six draw points are provided—three below each tank—and all are equipped with Jeffrey vibrating feeders. The discharge chute from each feeder is fitted with a hood which is lowered by electrical control to fit over the tops of the narrow gauge rail haulage cars.

The Easton cars, formerly used in hauling directly from the quarry loading shovel to the old crusher station at the plant, were equipped with staff-designed sloping sided tops, and now have 17-ton capacities. Drawpoint chutes are spaced so as to allow loading of six cars at once; and with the hoods lowered over the car tops, excellent control of discharge and dust is maintained. Three Norblo bag type dust collectors equipped with 5,000 c.f.m. fans are mounted above the storage tanks. Two are used to collect from the loading chute hoods, while the third draws from the storage tanks.

In 12-car trains, pulled by a Porter steam locomotive or a Whitcomb diesel unit, the stone is hauled from the quarry storage to the raw mill department when requested by the latter. Where previously the old crusher station had provided a minus 1½-in. product which was then processed through a Bradley mill prior to feeding a battery of four tube mills, the ⅜-in. stone now provided is transferred directly from feed bins to raw mill units.

The old tube mills are currently being replaced with two new 13- by 16-ft. Allis-Chalmers ball mills. At 94 t.p.h. from each, the two new units will have more than the combined capacity of the four tube mills and will readily meet requirements of the additional 11- by 390-ft. Allis-Chalmers kiln scheduled for installation in 1958.

At the site of the old crusher station the carloads of stone hauled from the quarry storage tanks are dumped into a hopper from which the material is raised *via* bucket ele-



Haulage cars have been equipped with tops, as shown in this view. These provide a car capacity of 17 tons. Discharge chutes from the feeders (above) are fitted with hoods that are lowered over the cars for positive control of discharge and dust.

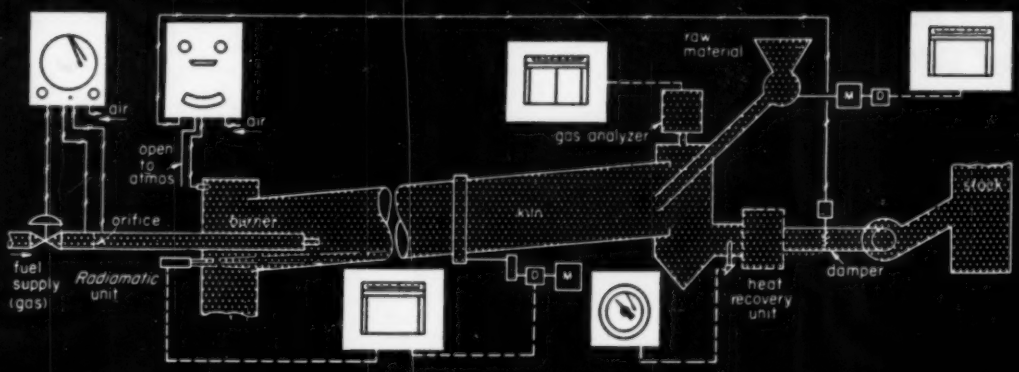


Diagram shows elements of typical kiln instrumentation.

From burner to stack–

Brown instruments keep rotary kilns, calciners and dryers at top efficiency

ON ROTARY KILNS used for many different mineral preparation and burning processes, high quality and uniformity of production are being obtained . . . at low overall cost . . . through the use of Brown instrumentation. Critical variables from one end of the kiln to the other can be measured and controlled by this comprehensive line of instruments.

Product temperature is detected by Radiamatic pyrometers . . . which in turn can initiate automatic fuel control.

Fuel flow is indicated, recorded, totalized and controlled by Brown flow meters . . . applicable to any type of fuel.

Kiln draft is held to precise limits by a Brown Pressure Controller, which actuates the stack damper to keep constant temperature gradients in the kiln.

Kiln speed and feeder speed are detected by Brown tachometers and recorded by *ElectroniK* instruments.

Temperatures in heat recovery equipment, stack gases, coolers, fore-heaters and inside the kiln are controlled or centralized on multi-point *ElectroniK* recorders.

Stack gas composition is automatically detected by a continuous analyzer, and recorded by *ElectroniK* instruments as a guide to economical fuel-air adjustment.

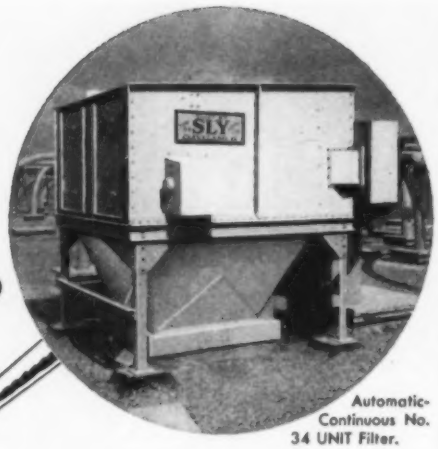
Using these and related instruments and accessories, Brown engineers are well qualified to design complete panels which focus the supervision of your own kiln in a single, integrated control center. For a discussion of your specific requirements, call your local Honeywell sales engineer . . . he's as near as your phone.

MINNEAPOLIS-HONEYWELL REGULATOR CO., *Industrial Division*, Wayne and Windrim Avenues, Phila. 44, Pa.—in Canada, Toronto 17, Ontario.

● **REFERENCE DATA:**
Write for Data Sheet No. 1.1-2, "Rotary Kiln Instrumentation."

MINNEAPOLIS
Honeywell
BROWN INSTRUMENTS
First in Controls

"Midget"
SLY
Filters
Do BIG Job
at Lehigh



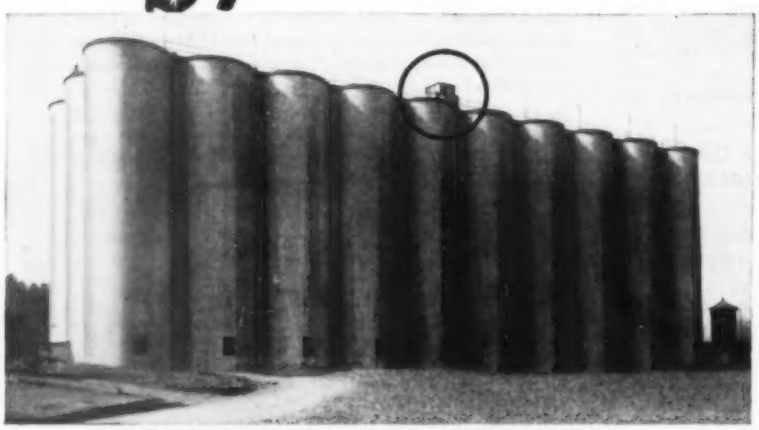
Automatic-Continuous No. 34 UNIT Filter.

The two Sly Filters in the illustrations pack plenty of filter cloth into their small overall dimensions. That's why they do such a big job for Lehigh Portland Cement Company, Alsen, N. Y. The Automatic-Continuous Sly Dust Filter handles 2,500 cubic feet of cement-dust-laden air per minute from silos being filled by pneumatic pumping system. The Automatic-Continuous UNIT Filter handles 1,000 C.F.M. Yet each is little more than six feet long.

Both feature a Sly design that eliminates costly piping. Dust-laden air enters the filter upward direct from the silos. When the filter bags are shaken, cement dust drops back into the silos.

This installation shows how Sly designs and installs dust control systems to produce maximum benefits for lowest cost . . . indicates why more Sly Filters are used by the cement industry than any other make.

REVIEW THE SLY LINE—
WRITE FOR BULLETINS 93, 98, 102


Circled is the Automatic-Continuous Type ED 260, No. 34 Filter.

THE W. W. SLY MANUFACTURING CO.
SINCE 1874
4745 TRAIN AVENUE • CLEVELAND 1, OHIO
OFFICES IN PRINCIPAL CITIES

vator to a distributing conveyor above four concrete silos. These four silos were also constructed as a part of the improvement program; each has a capacity of 1,800 tons. A Jeffrey vibrating feeder below each silo transfers stone to an underlying belt conveyor. The latter supplies a stacker from which the material is spread in the raw stone storage adjoining the raw mill room.

Obviously well on its way toward the projected goal of a 3,500,000 bbl. capacity in portland cement, the Speed plant bears but little resemblance to the layout prior to the comprehensive improvement program now nearing completion. Key personnel at this mill includes D. E. Willingham, vice-president, operations; W. P. Leake, general superintendent; Thomas McDonald, chief engineer; and Wallace Leach, chief chemist. Top administrative officers include Eugene D. Hill, president; Boyce F. Martin, executive vice-president and treasurer; Ray K. Hartsock, vice-president; John Mallon, vice-president, sales; and Roland Whitney, secretary.

Operations in the impressive new crushing plant and the quarry are headed by John Riggle, assistant to the general superintendent.

McEachern Investment Co. Joins Kaiser Industries

The J. A. McEachern Investment Company has merged with Kaiser Industries Corporation, with which it has been associated for many years in heavy construction projects. D. V. McEachern, former chairman of the investment company, has been named a director of Kaiser Industries.

As a result of the merger, Kaiser Industries is acquiring from McEachern 1,164,111 shares of Kaiser Aluminum common stock, 527,021 shares of Permanente Cement Company common stock, cash, and other assets. This acquisition will increase the corporation's direct and indirect interest in the common stocks of Kaiser Aluminum and Permanente Cement to 45 and 39 percent, respectively.

Kaiser Industries will issure 409,936 shares of its 6½ percent cumulative preferred stock and 2,475,363 shares of its common to the former McEachern stockholders.

THOMAS L. TOBIN has been appointed assistant to Richard S. McCarthy, public relations director of the National Gypsum Company, Buffalo, N. Y.

Permanente

(*From page* 93)

tugs tow bargeloads of cement from the Honolulu distributing plant to the Midway Island silos. Anchorage receives cement from Seattle by barges towed across the Gulf of Alaska and, in turn, supplies the installation at Fairbanks via the Alaska Railroad.

In addition to five specification grades of cement, the company makes nine specials: portland pozzolan, Pronto (modified high-early pipe cement), plastic, Brick Mix (masonry cement), low-alkali, and four different oil-well cements.

Main offices, now in Oakland, will soon be quartered in the new multi-storied Kaiser Center office building. Henry J. Kaiser is president and chairman of the board; Wallace A. Marsh, vice-president and general manager; E. E. Trefethen Jr., executive vice-president and treasurer; J. K. Beatty, vice-president in charge of sales; John M. Garoutte, vice-president in charge of cement operations; Peter S. Haas, vice-president and assistant general manager; William Marks, vice-president and secretary; Carl R. Olson, vice-president; and Paul Rogers, vice-president and controller.

Columbia Cement

(*From page* 136)

surface crushing plant is dismantled, the underground development will operate at only partial capacity. By the end of the year, the mine will probably be on the planned operation of 7 days per week with two daily shifts.

Headed by Walter K. Farst, general manager, the Columbia Cement Division is comprised of approximately 360 employees. Top supervisory and administrative men include G. R. Grimsley, superintendent; W. B. Sippey, director of sales; and K. L. Rothermund, sales manager.

New Iranian Cement Plant To Use British Equipment

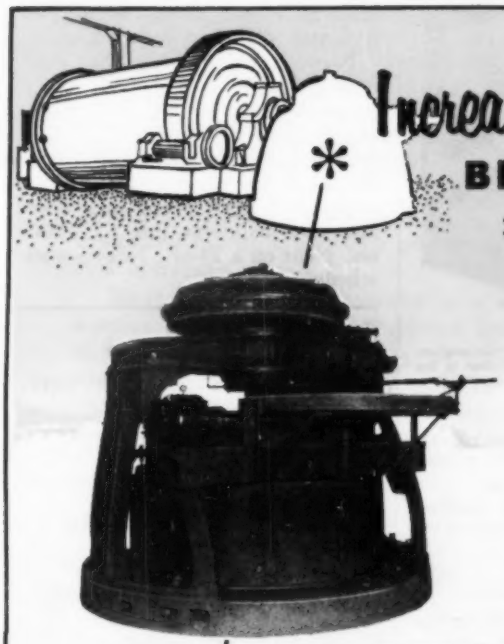
Edgar Allen & Company, Ltd., of Sheffield, England, has been commissioned to supply equipment for a plant in Iran, capable of producing 600 tons of cement clinker per day. It is believed to be the first time since World War II that a British firm has secured a contract to supply facilities for a foreign cement plant.

The facility, designed for the manufacture of portland cement by the wet process, will be situated midway between the Persian Gulf and the Caspian Sea. Limestone and clay are available in quantity in the immediate vicinity, three rivers supply ample water, and gypsum deposits are found within a radius of 35 miles.

Robert A. Engelhardt Receives Michigan Limestone Promotion

Robert A. Engelhardt has been promoted purchasing agent of Michigan Limestone Division, it was announced by C. G. Hogberg, vice-president of the United States Steel Corporation's raw materials subsidiary. He succeeds F. G. Corregon, who has retired.

Mr. Engelhardt began his employment with U. S. Steel in 1935, and served successively in the Carnegie-Illinois Steel Corporation, Pittsburgh Limestone, and then the Michigan Limestone Division. In 1952 he was appointed buyer and in 1956, assistant purchasing agent.



Increased CEMENT PRODUCTION

BRADLEY HERCULES MILLS

* *as a preliminary pulverizer for compartment or tube mills.*

The quickest, most economical way to increase your grinding capacity

For the cement manufacturer with excess kiln capacity . . . here is the answer to INCREASED CAPACITIES at an appreciable SAVING IN HORSEPOWER. The Bradley Hercules Mill, used as a preliminary pulverizer, before compartment mills or tube mills, results in INCREASED PRODUCTION of finished material at a LOWER COST per barrel.

Rugged, dustless construction, maximum accessibility keep maintenance costs at an absolute minimum.

Automatic electrical feed control eliminates manual operation.

For complete information, write for Catalog No. 57

Bradley PULVERIZER CO.

LONDON ALLENTOWN, PENNA. BOSTON

Peerless' New Plant

(*From page* 144)

trolled from the scale houses.

A Sly dust collector on top of the silos vents the air from the pumping system to atmosphere. Sly collectors at the four cement bulk loading spouts draw dust off through annular spaces around the spouts. Reclamation and silo sampling is accomplished by means of an auxiliary 4-in. Fuller-Kinyon pumping system feeding back to top of silos.

Miscellaneous Electric power is purchased from the Detroit Edison Company at 4,160 v., reduced by Peerless' transformers from 24,000 v. Voltage is further reduced at four strategically-located substations to 440 for the smaller motors. Underground conduit is used throughout the plant. The electrical distribution system is designed for all plant requirements of a 2-kiln operation, with only the addition of connected motors and starters. The underground conduit system was designed to provide for the full 3-kiln capacity potential of the site.

Water for process use comes *via* two 300 g.p.m. Fairbanks-Morse pumps at 182 ft. n.p.h. from the river. All other water comes from city mains.

The provisions for collecting dust are unusually complete. In addition to the two stack dust collectors and others already described, there are others at every dust source, for a total of 12 separate dust-collecting installations.

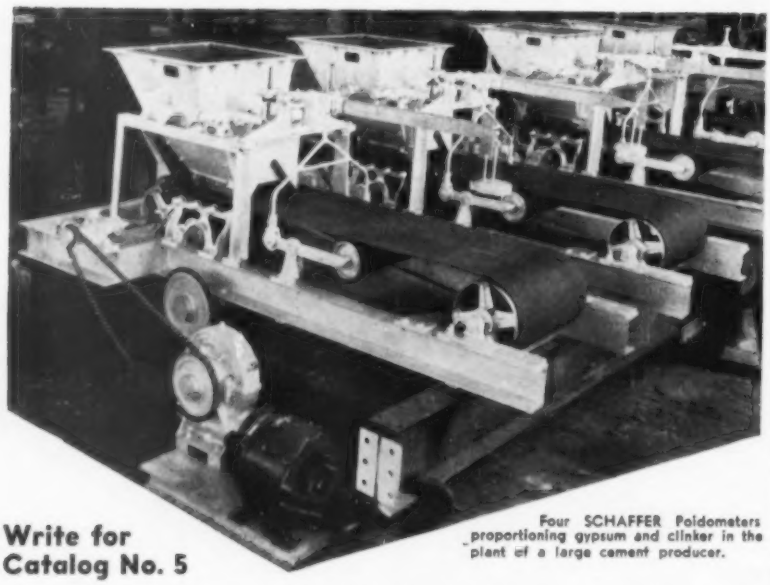
The engineering and architectural firm of Giffels & Vallet, Inc., of Detroit, designed the plant from general plans provided by Peerless, working in close co-operation with the important equipment manufacturers involved. Although the plant was designed primarily for efficient and practical operation, its architectural appearance was also felt to be important due to its location. The cement company acting as general contractors, sublet the actual construction to various local contractors, but retained general supervision over the construction and equipment installation. The Nicholson Company designed and built the cement storage silos. The Traylor Engineering & Mfg. Company supplied the kiln and all of its related equipment; Allis-Chalmers furnished all of the grinding mills; and the General Electric Company supplied all of the larger electric motors and the electrical equipment.

Partly due to the fact that some of the elements usually found in a cement plant are in this case located elsewhere, this new plant was built at a cost considerably lower than the usual cost per barrel of annual capacity. A crew of 65 men operates and maintains this 1,250,000-bbl. plant on a 24-hr., 7-day-a-week schedule.

Schaffer

Leading SCALE in the Cement Field

"POIDOMETERS on Parade"



Four SCHAFFER Poidometers proportioning gypsum and clinker in the plant of a large cement producer.

Write for Catalog No. 5

"All-in-One"
WEIGHER
BLENDER
FEEDER
MIXER
RECORDER
PROPORTIONER

YOU CAN'T IMAGINE the modern world without cement! SCHAFFER Poidometers help to satisfy the ever-growing demand for this indispensable commodity.

These high-speed, high-precision, automatic machines furnish weight-data wherever desired . . . insure an unbroken flow of uniform products.

Poidometers are easy to install and operate . . . good for many years of trouble-free economical service.

Available with total weight recorders, and remote control devices for showing and changing feed rate.

OVER 1500
now serving Industry

SCHAFFER
POIDOMETER COMPANY
2828 Smallman St.
Pittsburgh 22, Pa.

Raw Mix Drying

(*From page* 128)

indicated that a rate even higher could be reached at a lower fineness. The fineness and production rates show the tonnage which can be handled by the separator in terms of finished product.

Rate	Fineness #200
67 t.p.h.	87-88
80 t.p.h.	81-82

This separator is now driven by a 125-hp. motor.

(*To be continued*)

American Aggregates Corporation, Greenville, Ohio, has established three new sand and gravel plants located in Dayton and Columbus, Ohio, and Indianapolis, Ind.

LOOK TO DAYBROOK

...For a New Standard of Teamwork on the "Rock Routine"!

Daybrook builds a complete line of steel dump bodies and hydraulic hoists for *all* quarry and mine operations.

Many body types are available in a wide selection of capacities. And, Daybrook Speedlift® Hoists are offered in a range of conventional arm, direct-lift, telescopic, and "Power-Up"—"Power-Down" models. An outstanding feature of conventional arm and direct-lift hoists is the one-year warranty on the sealed hydraulic cylinder.

However rugged the job may be, there's a Daybrook body-hoist "team" to give long, dependable service.

Your Daybrook distributor will be glad to tell you about the many Daybrook exclusive body and hoist features that mean more profitable operation on the "rock routine."

SEND DAYBROOK LITERATURE CHECKED BELOW: 39

ROCK BODIES—HOISTS ☐ | POWER LOADER ☐ | EXCAVATOR BODIES—HOISTS ☐ | POWER GATE ☐

Sign below, attach coupon to letterhead, and mail in envelope.

Name

DAYBROOK Speedlift® TRUCK EQUIPMENT

DAYBROOK HYDRAULIC DIVISION
L. A. YOUNG SPRING & WIRE CORPORATION
BOWLING GREEN, OHIO

LAYCO

Paper on Abrasion Problem In Sand-Gravel Industry Wins Dravo Corp. Contest

A paper on abrasion-resistant materials used in sand and gravel production, reported in the April, 1956, issue of PIT AND QUARRY won second prize and $300 for its co-authors in the Dravo Corporation's 18th Annual Technical Papers Competition.

The collaborators are D. H. Marlin, research engineer, and W. L. Price, engineering manager of the Keystone Division. The paper was presented at the annual convention of the National Sand and Gravel Association in Chicago in February, 1956, and published later by the association for its members.

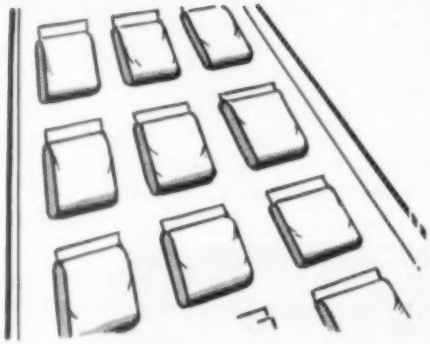
Right: Prize-winning Dravo Corporation engineers. Left to right: W. L. Price, engineering manager, and D. H. Marlin, research engineer, who collaborated on a prize-winning paper on abrasion resistant materials; J. H. Patterson Jr., field engineer, who won third prize, and C. W. Granacher, project engineer, winner of the first prize.

LESLIE G. HILGER has been named treasurer of the Arizona Sand & Rock Company, Phoenix.

Uniform CEMENT

assured with
MERRICK
FEEDOWEIGHTS

Photo at left shows a typical Feedoweight installation comprising four (4) Feedoweights—each feeding in correct proportion, a preset quantity of a basic cement material by WEIGHT. Photo taken at a large Missouri cement plant presently employing 35 Merrick Feedoweights*.



Industries, such as cement, steel, mining, limestone, coal, etc., standardize on Merrick Feedoweights to accurately feed, blend and proportion, by weight, such materials as: clinker, gypsum, coal, ore, aggregate and other miscellaneous raw materials. The time-proven performance of Merrick Feedoweights assures Product Uniformity at all times.

*Reg. U. S. Pat. Office

Write for Bulletins 253 and 375

Merrick Weightometers* have long been famous—for over 45 years—for their accuracy and efficiency in providing daily production records by continuously and automatically weighing bulk materials passing over belt conveyors.

MERRICK SCALE MFG. CO.
180 AUTUMN STREET • PASSAIC, NEW JERSEY

Diamond Springs Lime Co. Markets 10% Asbestos Lime

According to *Limeographs,* news letter of the National Lime Association, the Diamond Springs Lime Company, Diamond Springs, Calif., has begun marketing Marvel "A" lime—a Type S hydrated lime containing 10 percent asbestos. The asbestos reportedly increases workability, plasticity, water retentivity, and compressive and tensile strength. In addition, it imparts fireproofing and insulation characteristics.

Diamond Springs Lime also sells asbestos separately. Spokesmen of the firm recommend the use of 5 lb. per sack of cement or hydrated lime. Thin plastering coats, such as finish coats, however, require more asbestos for crack resistance—approximately 20 percent by weight of the total mix, or 50 percent by weight of lime. The company also offers prepared white coat plasters with asbestos.

Ideal Cement Company, Denver, Colo., plans to spend $170,000,000 in the next 10 years to increase capacity of its plants to 40,000,000 bbl. a year. A program to boost output to 31,000,000 bbl. is under way and should be completed in 1958.

Groundbreaking ceremonies for the new multimillion-dollar plant at the Mississippi Valley Portland Cement Company were held recently at Redwood, Miss. Production is scheduled for the spring of 1958. An estimated 680,000 bbl. of cement will be produced annually.

The Pakistan Industrial Development Corporation in Karachi, India, is planning to expand the capacity of its cement plant at Daukhel, West Pakistan, from 350 tons to 850 tons per 24-hour day.

Smith Brothers Silica Sand Company of Auburn, Wash., has built a new plant and increased its output of sand from 60 or 65 tons to 100 tons per day.

Appointments and Promotions

The Associated General Contractors of America has promoted WILLIAM G. DOOLY JR. to manager of its department of public relations and publications, and editor of its official magazine, *The Constructor*.

Mr. Dooly, who has been assistant manager of public relations and assistant managing editor of the magazine for several years, fills the vacancy created by the death of William E. Woodruff, who was department manager and managing editor of the magazine.

The association also announced changes in titles of the magazine's executive department. JAMES D. MARSHALL, executive director, becomes publisher, and WILLIAM E. DUNN, assistant executive director, associate publisher. FRANK J. ROONEY, Miami, immediate past-president, was elected president of the board of directors.

• • •

G. A. GRANT has been appointed vice-president and director of sales for the Canada Cement Company Limited. A. L. CAMPBELL was named general sales manager, and H. E. SAVOIE, assistant general sales manager.

R. A. JODREY, C. V. EMERSON, and V. C. HAMILTON were appointed directors at the company's annual meeting.

• • •

The appointment of RAY SWARTS as sales representative for the Calaveras Cement Company in the Redding area was announced by Mel J. London, vice-president in charge of marketing. Mr. Swarts will be in charge of dealer and contractor sales in seven northern California counties and in southern Oregon.

• • •

GEORGE T. COLLINS was appointed director of Pennsalt International Corporation, a subsidiary of Pennsalt Chemicals Corporation, by P.C.C. President William P. Drake.

Mr. Collins, who has been assisting the president, will be in charge of foreign operations, which to date include a fluorspar mine and three chemical manufacturing plants in Mexico and subsidiaries in Venezuela, Brazil, and Peru.

D. C. Hickey Jr., who has been associated since 1940 with the General Crushed Stone Company of Easton, Pa., has been appointed chief engineer of the firm. He served as plant superintendent for the company at several locations and has been construction engineer since 1945.

• • •

R. K. CUNNINGHAM and J. R. DOOLITTLE have been appointed vice-presidents of Canada Crushed & Cut Stone Limited, Hamilton, Ont., Canada. Both were formerly executives of the firm's subsidiary companies, National Cut Stone Limited and Queenston Quarries Limited.

• • •

FLOYD T. ERICKSON was appointed assistant vice-president of the Consolidated Rock Products Company of Los Angeles, Calif. He became general sales manager in 1945, and has been with the firm nearly 29 years. His work will be in connection with sales activities.

Taking over Mr. Erickson's former position is EBER E. JAQUES, who joined the corporation in 1951 as assistant general sales manager.

CUSTOM BUILT

Peerless Cement Corp. *Detroit, Mich.*

THE NICHOLSON CO.

10 ROCKEFELLER PLAZA, NEW YORK, N. Y.

Canada Cement

(*From page* 86)

there is a 960-bbl. clinker bin, a 170-ton gypsum bin, and a 200-ton limestone bin, the last-mentioned for the manufacture of masonry cement. A Barber-Greene rotary drier is to be installed which will reduce the stone moisture to 2 percent at the rate of 35 t.p.h. Under each bin is a Smidth Pendan variator-controlled feeder. These discharge the materials in the desired proportions onto three short belt conveyors which in turn discharge to spiral feed drums through the trunnions of the three mills. The feeder controls are so designed that changing rate of clinker feed automatically changes the gypsum and stone feed rate to compensate. Over each belt there is a reciprocating plate type feeder for the dry air-entraining agent.

These 8-ft. 6-in. by 30-ft. 6 in. 2-compartment Smidth Unidan mills are similar in many ways to the two trunnion-type raw mills, and have identical drives. They also have movable feed-end trunnion bearings on rollers. Each mill is driven at 20.5 r.p.m. by a 1,100-hp. 720-r.p.m. G-E automatically self-synchronizing synchronous motor through a Smidth Symetro gear reduction unit. Ball loadings are as follows:

Size	Comp. 1	Comp. 2
3-in.	18,000 lb.	
2½-in.	18,000 lb.	
2-in.	14,000 lb.	
1½-in.		20,000 lb.
1-in.		40,000 lb.
¾-in.		34,000 lb.
		Total 144,000 lb.

The product of each mill is carried by a Fuller-Huron Airslide conveyor to a bucket elevator and screw conveyor feeding a 16-ft. Sturtevant separator. From here on the circuit is somewhat unusual. A fan draws dust from the mill feeders through a cyclone, the dust dropping onto the mill feed conveyor, and the air going to the inner cone of the separator. The air discharged from the separator goes to a Norblo No. 540-A automatic bag-type separator. Collected dust and the finished cement from the separator are carried by the same Airslide to the cement pumps when standard portland cement is being made. Separator rejects are discharged by gravity back onto the mill feed conveyor.

When masonry and high-early-strength (Type III) cement is being made, the dust from the collector can be returned to the mill feed if desired. The circuit is otherwise the same, except for the separator blades.

When standard cement is being made, only 30 of the 60 separator blades are used; for masonry cement all of the blades are used. Each mill circuit grinds 160 bbl. per hr. of standard portland cement to a fineness of 2,800 sq. cm./gm. Blaine. Masonry cement capacity is 100 bbl. per hr. ground to a fineness of over 6000 sq. cm./gm. Blaine. Each mill circuit is connected to another collector, a Norblo No. 216-A.

Auxiliary equipment for both raw and clinker mills is started and operated from centralized control panels. The main mill motors are started in the motor room. The Pendan feed rate is adjusted by a handwheel on the feeder body, which through electrical Selsyn connection will keep the two or three feeders for the clinker mills in step. Interlocks and running lights are all on these panels.

The three mill circuits and their pumping systems to storage make it possible to produce both types of cements separately or simultaneously, using any or all of the mills for either type. There are two Fuller-Kinyon pipelines to storage—a 10-in. line leading to the large main silos for standard cement and an 8-in. line to the smaller special cement silos. A 9-in. Fuller-Kinyon pump is used only when all three mills are making a standard cement, and it can feed only to the 10-in. line. An 8-in. pump can take the product of any two mills on either type of cement and can feed to either the 10-in. or the 8-in. line. A 7-in. pump is used only when masonry or high-early-strength cement is being made in one mill, and it can feed only to the 8-in. line.

Cement Storage and Packing The 10-in. cement line distributes standard portland cement to nine concrete storage silos, each 60 ft. in diameter by 65 ft. high with a capacity of 40,000 bbl. each. These are arranged in three rows and are far enough apart for the four special cement silos to be placed between them; these four are 40 ft. in diameter by 65 ft. high and hold 19,000 bbl. each, for a total of 400,000 bbl.

Withdrawal of cement is by the Smidth Fluxo extractor system. Each silo has a V bottom with an 8 degree slope from two sides to the center. A series of sloping troughs have in them canvas-wrapped pipes by which the cement is areated, causing it to flow toward the centerline. Standard cement from the large silos flows to a pair of 16-in. diameter screw conveyors under each of the three rows of large silos. These all discharge to an 18-in. diameter cross screw conveyor, from which a bucket elevator feeds to the packhouse. There 18-in. screw conveyors distribute the standard portland cement to the feed bins over three St. Regis 4-spout, Type F 111C packers. These screws can also discharge the cement through spouts for bulk car loading or onto a belt conveyor to the bulk truck-loading silos. The bulk cars are loaded on Fairbanks track scales.

The masonry cement in the four smaller silos is similarly aerated and moved *via* a sealed screw conveyor and elevator system to the packhouse. There it is discharged into the feed bin of a fourth identical packer. These packer circuits have all of the usual features such as high- and low-level indicators and dust returns. Bags are discharged on shuttle belt conveyors for loading into cars or trucks on opposite sides of the building. The standard cement circuit is vented to a Norblo No. 648-A collector, and the masonry cement circuit to a No. 324-A unit. This department is so designed that it can be enlarged readily to pack three additional types of cement separately and without contamination through the packing machines.

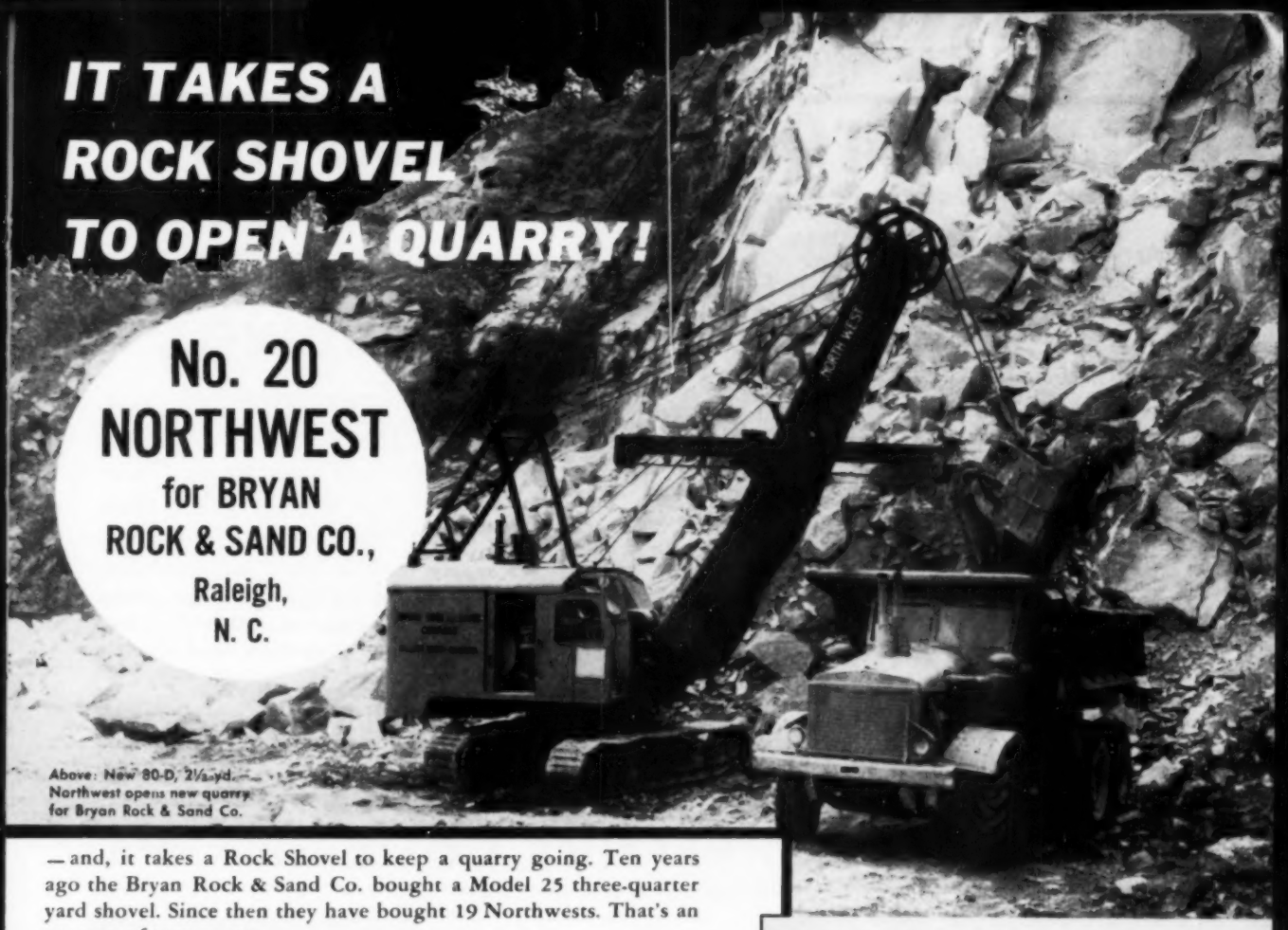
The 30-in. by 225-ft. conveyor to the bulk truck-loading silos is fully enclosed. It discharges into the two 25-ft. diameter by 40-ft. silos which hold 4,000 bbl. each. The cement in the silos is aerated through porous blocks and is discharged through a rotary valve and collapsible spout into trucks below. A 125- to 140-bbl. truck can be loaded in 2 minutes. There is a 100-ton Fairbanks truck scale with a 72-ft. platform under one of the silos. This is used only to prevent overloading as all bulk truck shipments are weighed on another scale at the yard office. All dust sources at these silos are connected to a Norblo No. 324-AMG bag-type collector.

Chemical Control The plant laboratory in the general purpose building is used mainly for control and is completely equipped for that purpose. The chemists' chief concern with the clay is its moisture content of 41 percent. The average raw mix is 69.6 percent limestone, 29.6 percent clay and 0.8 percent iron cinders. Slurry is ground to 90 percent through 200-mesh and

(*Continued on page* 163)

IT TAKES A ROCK SHOVEL TO OPEN A QUARRY!

No. 20 NORTHWEST for BRYAN ROCK & SAND CO., Raleigh, N. C.



Above: New 80-D, 2½-yd. Northwest opens new quarry for Bryan Rock & Sand Co.

—and, it takes a Rock Shovel to keep a quarry going. Ten years ago the Bryan Rock & Sand Co. bought a Model 25 three-quarter yard shovel. Since then they have bought 19 Northwests. That's an average of two a year.

The business of Bryan Rock & Sand Co., as their name indicates, is ROCK and only real hard rock equipment can fill their requirements.

Northwest design begins from the bottom up for rock work—cast steel machinery bases and machinery side frames, crawlers that give self-cleaning action and more easily negotiate tough going, the Cushion Clutch that eliminates shock overloads to parts under power, the "Feather-Touch" Clutch Control for easier handling. Uniform Pressure Swing Clutches that take the jerks and grabs out of swinging, the Northwest Dual Independent Crowd that utilizes force most other independent crowd shovels waste—these are but a few of the advantages that Northwest Rock Shovels bring you. And remember, if you have a *real* Rock Shovel you never have to worry about output in *any* digging. With the advantages and proved performance of a Northwest it's no wonder Northwest owners come back!

Above: Model 6 Dragline strips overburden.

NORTHWEST ENGINEERING COMPANY
135 South LaSalle Street • Chicago 3, Illinois

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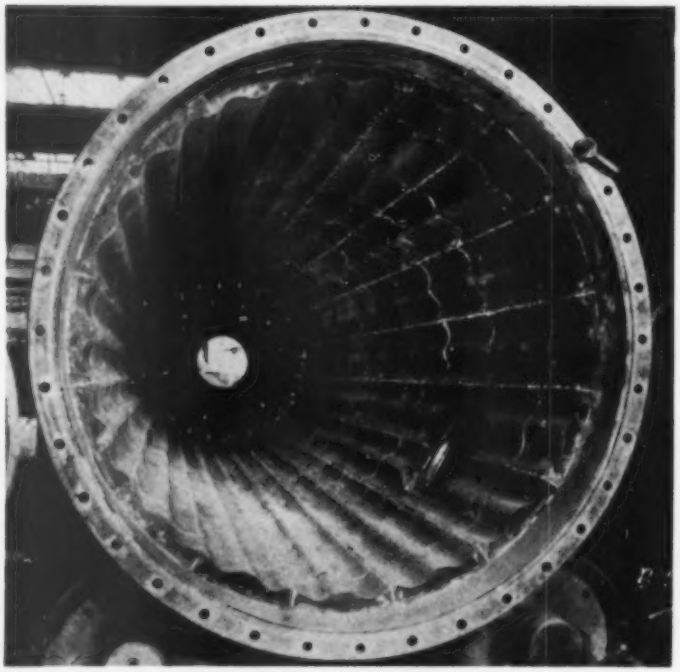
NORTHWEST

SHOVELS • CRANES • DRAGLINES • PULLSHOVELS

Convertible for any Mining Material Handling or Excavation Problem

"The CASTING that's LASTING"



Cuts CEMENT Costs

It's Another

"TREADWELL"

Installation

"TREADWELL" cast these Ni-Hard liners for a 7' x 26' Tube Mill used for wet grinding cement rock.

We supply these Ni-Hard abrasion-resistant castings for other applications where severe wear is encountered as well as ductile iron, heavy gray iron, and electric furnace steel castings.

Complete facilities for gamma raying, magnafluxing, mechanical testing and machining.

TREADWELL ENGINEERING CO., Easton, Pa.

BAUGHMAN BULK MATERIAL TRANSPORT BODY . . .

designed for

Cement, Salt, Sand, or any free flowing material

FOR ADDITIONAL INFORMATION

write for new illustrated bulk body catalog.

- **NEW 9" NON-CLOGGING AUGER.** Located at bottom of body. Unloads 1 to 2 tons per minute, depending on material.
- **COMPARTMENTED BODY.** Relieves weight of full load on conveyor. Compartment doors individually tripped as load empties.
- **SCIENTIFICALLY SLOPED SIDES.** Assure constant material feed to auger. For any dry, free-flowing, non-abrasive material.

Dealers wanted in Selected Areas

BAUGHMAN

BAUGHMAN MANUFACTURING COMPANY

144 Shipman Road • Jerseyville, Illinois

Canada Cement

(*From page* 160)

is held at 37 percent moisture. Mix control is based on constant potential C_3S. This is now being held to 72.5 percent, which is equivalent to holding the lime content in terms of total carbonates at about 79.00 X CO_3. Finish grinding of cement is controlled by Blaine air-permeability to 2,800 sq. cm. per gm. The gypsum addition averages 5 percent to hold the SO_3 content at 2.40 percent.

Slurry samples are taken every two hours at the raw mill sumps. When the correcting silos are full, samples are taken and analyzed for total carbonate content, moisture, and fineness. There are continuous automatic samplers on the finish-grinding mills —screws driven by small motors and reducers to provide about a 1-gal. sample every 2 hours. These samples are used for Blaine tests, etc. Samples are also taken at the packhouse.

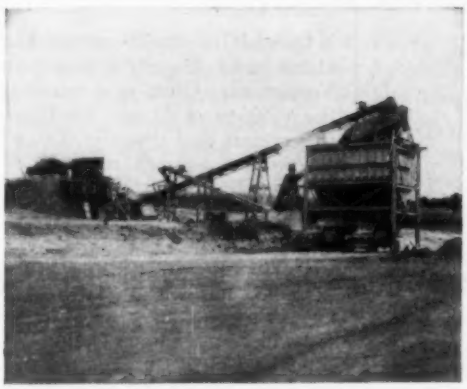
Electrical Power Power is purchased at 115,000 v. from the Ontario Hydroelectric Power Commission because this was the only available source of power of this quantity in this area. This is reduced to 12,000 v. at a company-owned substation with two 8,000-kv.-a. transformers. At the quarry an auxiliary secondary substation reduces to 4,160, 2,300, 550, and 110 v. The 4,160 v. current is for the primary and secondary crushers; the shovel, dragline, and drill use 2,300 v.; the conveyors and all other motors use 550 v.; and 110 v. is for lights.

For use in the plant the 12,000 v. current goes to the main secondary substation, which reduces to 4,160 v. only. The latter is distributed to the various plant departments—packhouse, kilns, raw and clinker mill, basin department, machine shop, etc.—for further reduction. At the mill departments 4,160 v. is used for the mill drives. A 4,160-v. motor also drives the motor-generator set which provides direct current for the kiln drive motor. All other motors in these and other departments are 550 v., and 110 v. is used for lights. The whole system is 60-cycle, whereas the rural distribution was 25-cycle, This represented a problem during construction and changeover.

All distribution of power is through underground conduits, and all switchgear is magnetic, with both remote and local control. Every department with sequence operation is interlocked for automatic stopping, but each individual unit must be started separately. The quarry drill, dragline, and shovel each have 1,000 ft. of General Electric trailing cable.

Water Getting an adequate, dependable supply of water for such a large wet process plant was a serious problem. The only water available in the immediate vicinity is from wells, five of which were drilled. The water from the wells goes to a storage pond of 10,000,000-gal. capacity. A spray system is used to let excess H_2S escape. Service pumps supply water from the pond to the plant through Johns-Manville Transite pipelines. The reserve of water has been proved, and drinking water comes from the other wells.

Miscellaneous This plant was designed by the Canada Cement Company's own staff under the direction of the following: J. W. Breen, president; V. C. Hamilton, general manager of operations; Harold B. Howe, chief engineer; M. S. Jackson, electrical engineer; T. J. Kennedy, superintendent of plants; and their assist-



SINCE 1885—GRUENDLER QUALITY, BEST MONEY CAN BUY

Making little ones out of big ones!

VIEW No. 1 Here you see a Big Gruendler Portable Primary Crusher with 8 foot Apron Feeder handling 125 to 150 tons hourly. On location in Missouri—a Brute for Strength, Long and Economical Life.

VIEW No. 2 A Gruendler Stationary Plant with Primary Jaw Crusher and Hammer Mill making uniform cubical Aggregates and Ag-Stone. On location at Litchfield Stone, Litchfield, Illinois.

Big Profit Makers because they can take it. No better time than now to modernize for the large Highway Program.

WRITE FOR BULLETINS

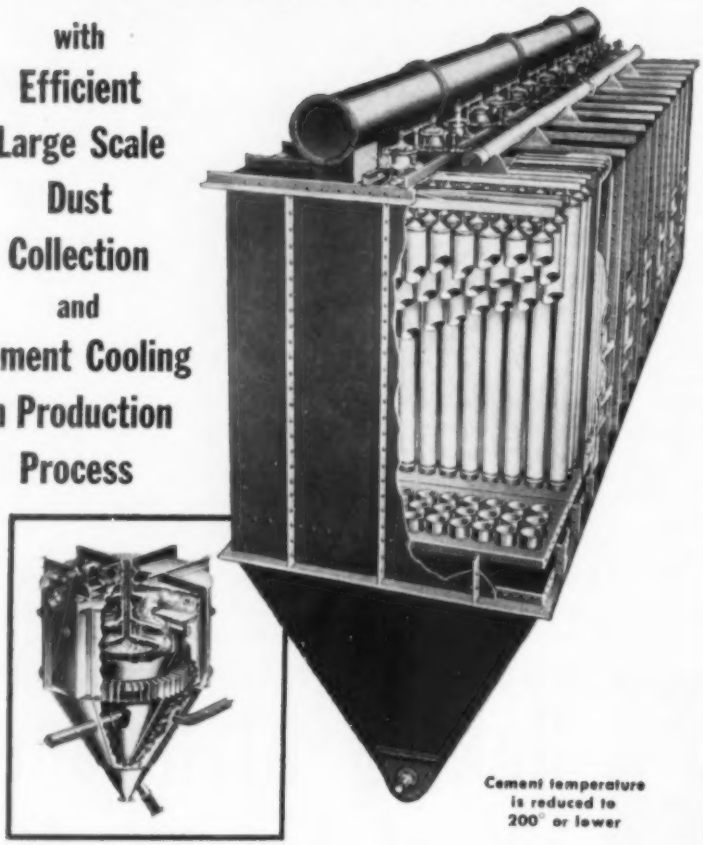
GRUENDLER

GRUENDLER CRUSHER & PULVERIZER CO.

2915 N. Market St. Louis 6, Mo. U. S. A.

Norblo serves the Cement Industries well—

with Efficient Large Scale Dust Collection and Cement Cooling in Production Process



Cement temperature is reduced to 200° or lower

Norblo's Cement Air Cooler and Dust Collection System (patented) combines two separate functions necessary for modern cement manufacture in one unit. The system cools both fines and tailings—eliminates higher temperatures that damage the finished product—and keeps temperatures inside the mill at more comfortable levels. Norblo Automatic Bag Type Dust Arresters with cyclic bag cleaning provide maximum efficiency of collection with low maintenance and operating cost. Remarkable results are achieved today in hundreds of American and foreign mills.

Norblo's wide experience in the cement field is quickly made profitable to you. A survey of your operations, at your invitation, brings sound recommendations for application of dust control and beneficial cooling in cement manufacture.

The Northern Blower Company

6407 Barberton Ave., Cleveland 2, Ohio • OLympic 1-1300

Norblo ENGINEERED DUST COLLECTION SYSTEMS FOR ALL INDUSTRIES

ants. F. L. Smidth & Co. were consultants on machinery and supplied most of the major equipment which this firm has built in Canada. Dinsmore Construction Ltd. was the general contractor, and construction was under the supervision of H. W. Hamilton, plant superintendent. Cement storage silos were built by Dinsmore under the supervision of the Nicholson Co.

The plant office is a monolithic concrete structure, located at the plant entrance. The laboratory, foremen's office, locker and lunch room are grouped together in a general purpose building, strategically placed within the plant area for access and convenience. This is also of monolithic concrete.

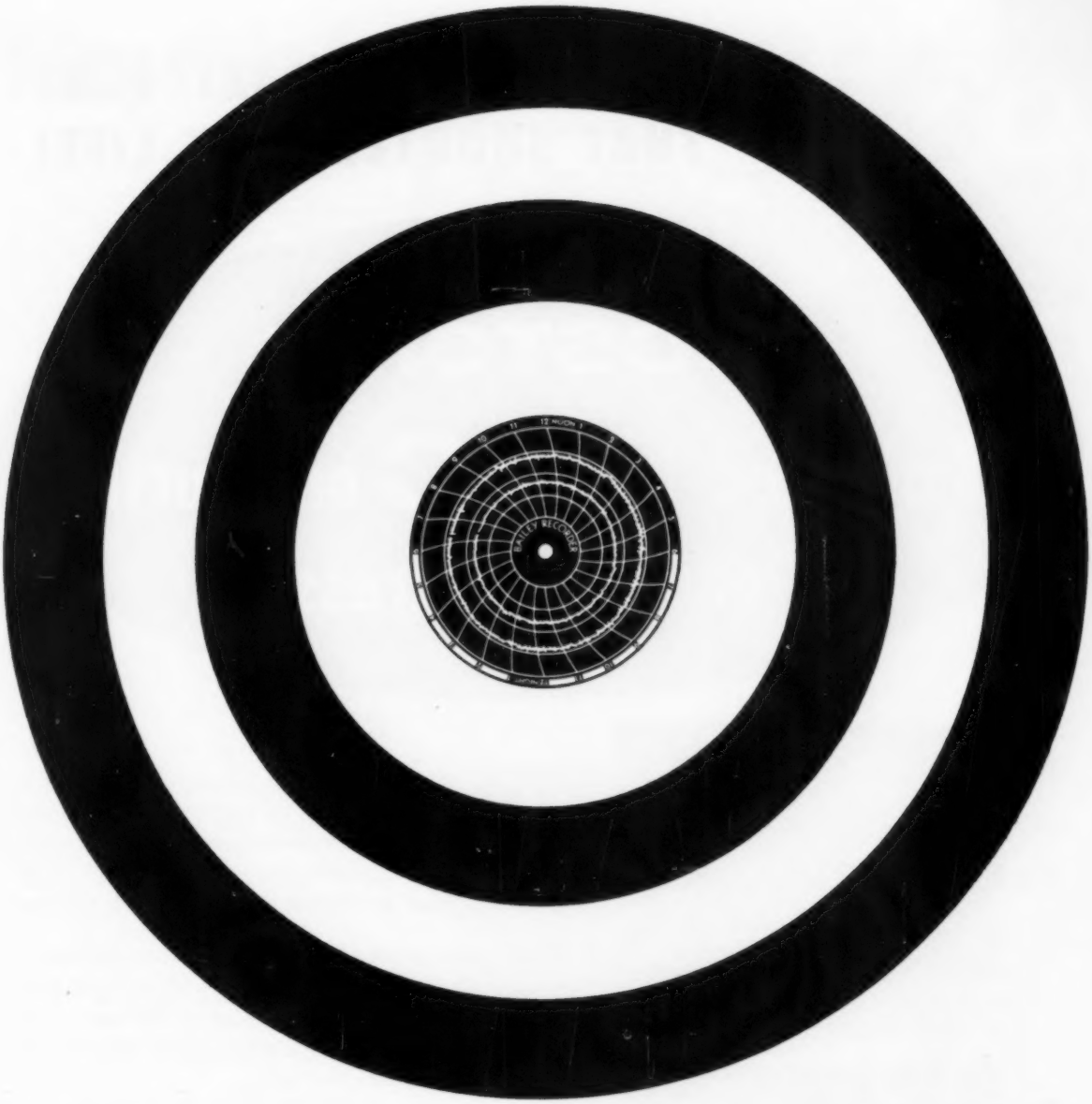
Other service buildings provided include the machine shop; stores (heated); rough stores (unheated); and the service building for the quarry, wash mill, and crusher departments, which are across the main track of the C.P.R.

As the plant site is on unstable clay of considerable depth, most of the buildings are supported on Raymond step-tapered steel-encased concrete piles ranging from 15 to 30 ft. in length and driven to refusal. A total of 8,000 piles were used, 3,600 under the cement silos alone.

The major buildings are either of monolithic concrete construction or have concrete framework with concrete block filling. All of these buildings have monolithic concrete floors, and most of them have concrete roofs. A few buildings have structural steel frameworks with asbestos siding and precast reinforced concrete roof slabs. Belt conveyors have structural steel bents and galleries with corrugated asbestos siding and roofing. All structural steel was erected with high-tensile bolts, which saved considerable time. Steel sash windows are standard; translucent synthetic sheets are also used.

Officials of the Bessemer Limestone and Cement Company, Youngstown, Ohio, have announced the election of HARRY G. HINSON as secretary and treasurer, LULA M. KIVINE as assistant secretary, and ROBERT L. ROSENBERGER as assistant treasurer of the firm.

HAROLD L. IRICK has been appointed controller of the Louisville Cement Company, Louisville, Ky. He will be in charge of all accounting and control functions and will head the accounting department.



NOW—*BULL'S-EYE KILN CONTROL*

at maximum capacity

Your recorder charts will resemble bull's-eye targets when your kiln is equipped with Bailey Automatic Kiln Control. A Bailey controlled kiln literally thinks for itself . . . Reacts quickly and correctly to any changes in operating conditions. Steady-state operation at maximum kiln capacity is achieved for days at a time with little or no supervision.

A Bailey Engineer will be glad to help you plan for *bull's-eye* kiln control. Write for a ROTARY KILN CONTROL FOLDER, complete with case histories and charts. C-9

Instruments and controls for power and process

BAILEY METER COMPANY

1051 IVANHOE ROAD • CLEVELAND 10, OHIO

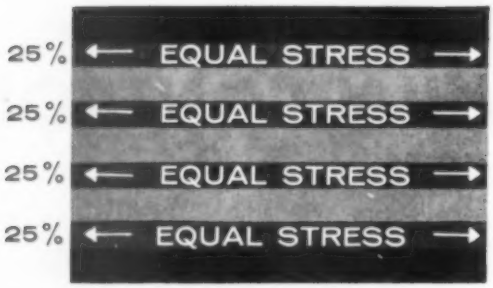
In Canada—Bailey Meter Company Limited, Montreal

BAILEY METERS

STOP PAYING FOR "LAZY" PLIES THAT SHORTEN BELT LIFE!

BOSTON'S Balanced Belt Construction equalizes stress!

CONVENTIONAL BELT CONSTRUCTION



BBC-BALANCED BELT CONSTRUCTION

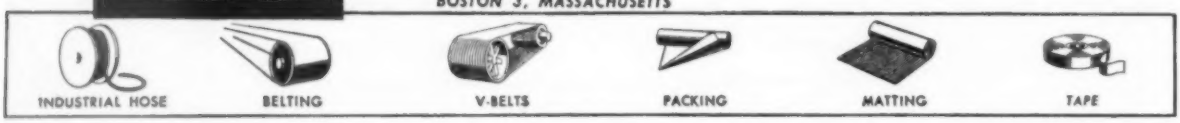
BBC — Balanced Belt Construction equalizes ply stress — every ply pulls its full share of the load! BOSTON'S exclusive manufacturing methods eliminate "lazy" plies which put extra strain on other plies and cause premature rupture and belt failure.

BBC is the result of two advanced BOSTON processes: *Electro-Tensile Control,* which electronically controls ply tension; and *Rotocure* the only continuous method of vulcanization, which assures uniformity throughout the belt.

With Balanced Belt Construction, BOSTON belts set entirely new standards of longer, trouble-free service and greater economy.

Your BOSTON man will be glad to demonstrate the advantages of Balanced Belt Construction to you!

BOSTON BOSTON WOVEN HOSE & RUBBER CO.
BOSTON 3, MASSACHUSETTS



Why this feeder doesn't cave in

● The reason is simply this: *The* PIONEER-ORO *Feeder is the most rugged feeder ever built.*

Take a look at its massive pans . . . cast from a special wear-resistant manganese steel, heavily ribbed, reinforced, and all the way from 5/16" to 1" thick, depending on width of feeder. The pans are supported by heavy, closely-spaced manganese steel rollers, keyed 3 to a heavy diameter shaft. Each shaft turns in 3 heavy-duty bearings rigidly supported on the feeder frame.

Takes heaviest dump loads

The PIONEER-ORO is designed for the roughest, toughest feeding jobs on earth. It withstands the impact of the heaviest dump loads. It shrugs off abrasion from hard ores, slag, flintrock, granite, and other coarse, heavy materials.

But the mighty PIONEER-ORO offers more than sheer, brute strength. It is a smooth-running, finely engineered unit designed to deliver a constant flow of heavy, abrasive material, with a minimum of maintenance. Even preventive maintenance costs are low.

Rivetless pans overlap and interlock

Pans, for example, overlap and interlock to provide added stability and stop leakage and spilling. Upturned end flanges also reduce loss of material. Drive links are cast as an integral part of the pan, so there are *no bolts or rivets that can loosen.* Easily replaced link bushings need no lubrication.

Sprocket teeth are readily reversed or replaced without taking the sprocket hub from the shaft or even disconnecting the pans. Like all other wearing parts, these teeth are cast from special wear-resistant manganese alloyed steel.

Supporting rollers and shafts can be removed, too, without disturbing the pans.

OTHER FEATURES

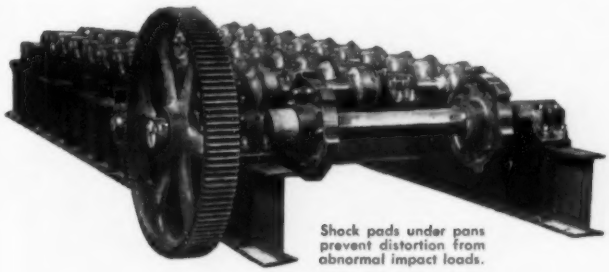
1. Patented lugs in pan links remove dirt, make links self-cleaning.
2. Feeder can be made to run in either forward or reverse direction.
3. Available in standard widths up to 84", widths in excess of 84" by special order, and lengths as required.
4. Made with 6", 9", 12" or 15" pan pitch (depending on width) to fit available head room.

PIONEER-ORO FEEDER
Capacities in tons per hour

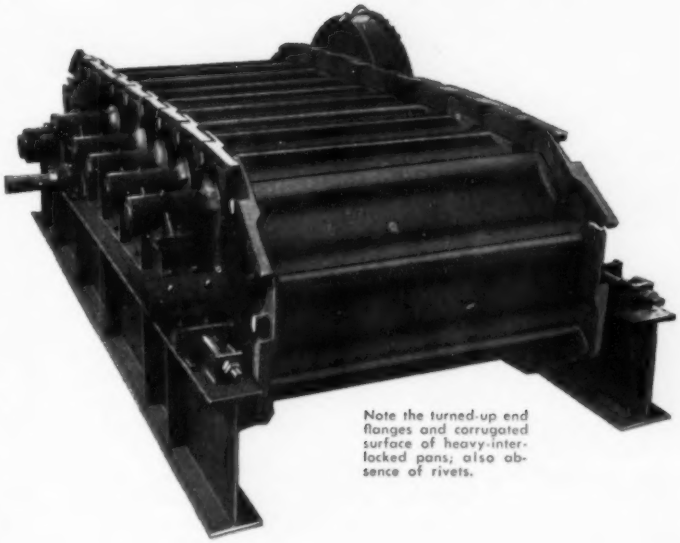
Travel per Min.	Width of feeder						
	30"	36"	42"	48"	60"	72"	84"
10'	74	108	147	192	300	432	588
15'	112	162	222	289	450	648	888
20'	148	216	294	384	600	864	1176
25'	186	270	368	482	750	1080	1472
30'	223	324	442	577	900	1296	1768

Ask Your Feeder Salesman These Questions

1. Are pans made from special manganese steel? How thick?
2. Are pans and links cast together so they are rivetless?
3. Can manganese parts be replaced without disassembling pans?
4. Are rollers keyed to shafts which turn in heavy bearings?



Shock pads under pans prevent distortion from abnormal impact loads.



Note the turned-up end flanges and corrugated surface of heavy-interlocked pans; also absence of rivets.

For further details and specifications regarding full line of PIONEER Feeders, write Pioneer Engineering, Minneapolis 14, Minn. (Division of Poor & Company, Inc., Chicago) or see your nearest PIONEER Distributor.

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Division of Poor & Company, Inc. • Chicago
Please send information on equipment checked.

☐ GRAVEL PLANTS ☐ WASHING PLANTS ☐ MECHANICAL FEEDERS
☐ ROCK PLANTS ☐ BITUMINOUS PLANTS ☐ VIBRATING SCREENS
☐ JAW CRUSHERS ☐ APRON FEEDERS ☐ BUZZER SCREENS (LIGHT DUTY)
☐ ROLL CRUSHERS ☐ ORO FEEDERS ☐ CONTINUFLO CONVEYORS

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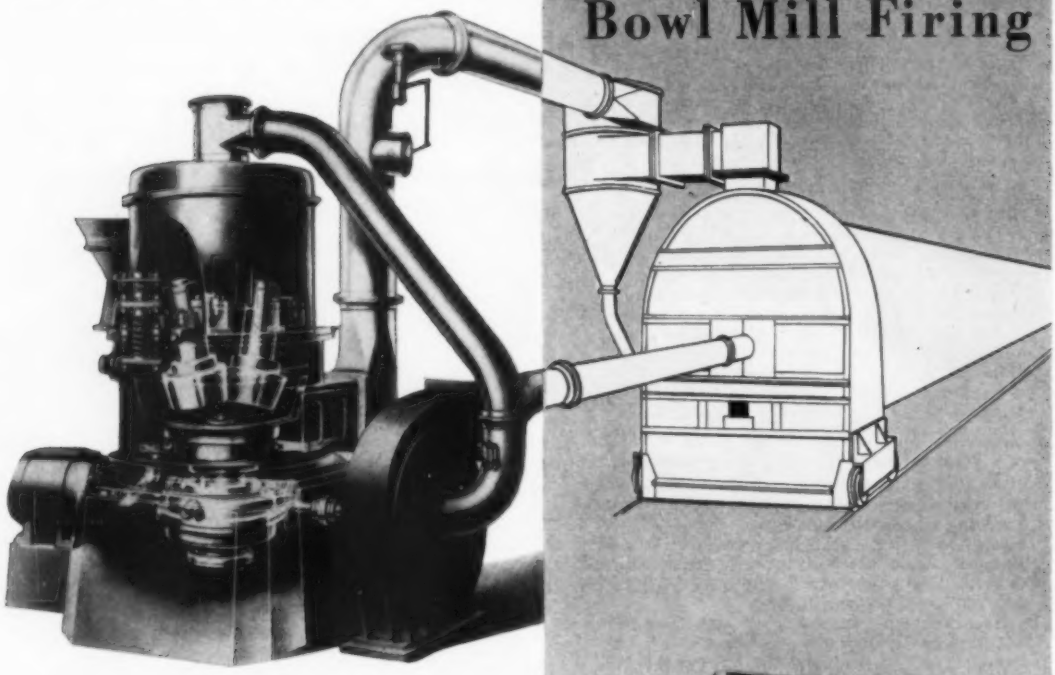
*City*_____ *Zone*____ *State*_____

Pioneer®
EQUIPMENT

Improve your KILN PRODUCTION with RAYMOND Bowl Mill Firing



Modernize your cement plant by using this fully coordinated and automatically controlled system of coal pulverizing and kiln firing.

The Raymond Bowl Mill is specially designed for the job with a unique principle of operation . . . the "bowl", or grinding chamber, revolves around the rolls. This results in centrifugal action that constantly forces the coal between the grinding elements and, since there is no metal-to-metal contact, the coal grinds on itself, insuring rapid reduction and high efficiency. The operation is completely noiseless, and without vibration.

The practical advantages of the Bowl Mill are: uniformity of grind on coal of any grade or moisture content . . . proper coal-air mixture to the burner at all times . . . extra high availability and flexibility in control . . . automatic rejection of tramp iron and impurities in the coal . . . smooth, dustless operation . . . record low maintenance and operating costs.

PANEL BOARD CONTROL
Gives a continuous operating picture of Bowl Mill performance. A single unit or a battery of Bowl Mills easily operated by one man.

For further details and performance records of Raymond Bowl Mills, ask for Catalog #75.

C-E

SALES OFFICES IN PRINCIPAL CITIES

COMBUSTION

RAYMOND DIVISION

Increase your CEMENT CAPACITY

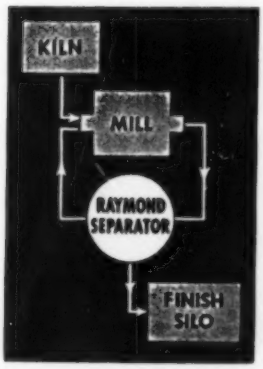
with RAYMOND Whizzer Separation

This is the key unit to economy in your closed circuit grinding operations in making cement clinker or raw mix. By using the *double whizzer* type of Mechanical Air Separator, you can obtain a wide range of control in particle size.

With the grinding mill properly adjusted for the different degrees of fineness desired, it is possible to control the specific surface area, so as to produce either the standard grades or the high early strength cements merely by setting the vertical slide dampers from the outside.

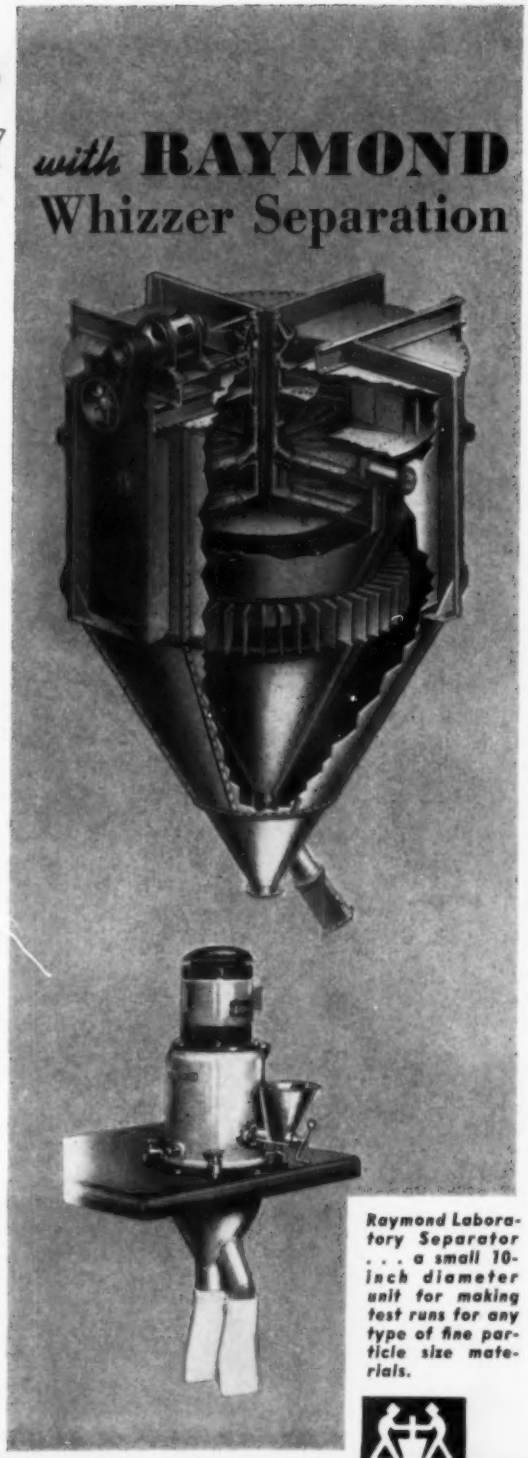
When the Separator is used in closed circuit with a mill, the overall capacity of the combined unit is always increased to such an extent that the addition of the Separator, with its power, is more than justified, resulting in extra economies. Capacity increases have varied from 25% to 100% or more, depending on the type of mill and grinding characteristics of the material.

Whether classifying cement, limestone, lime silica, gypsum, chemicals and a variety of other materials, the Raymond Whizzer Separator is equally effective. It insures close separation of the fines, consistent uniformity and low production costs. When used on abrasive materials special protective liners are provided.



Showing how the Raymond Mechanical Air Separator provides an important link in the closed circuit operation of grinding mills for cement production.

Write for Separator Bulletin



Raymond Laboratory Separator . . . a small 10-inch diameter unit for making test runs for any type of fine particle size materials.

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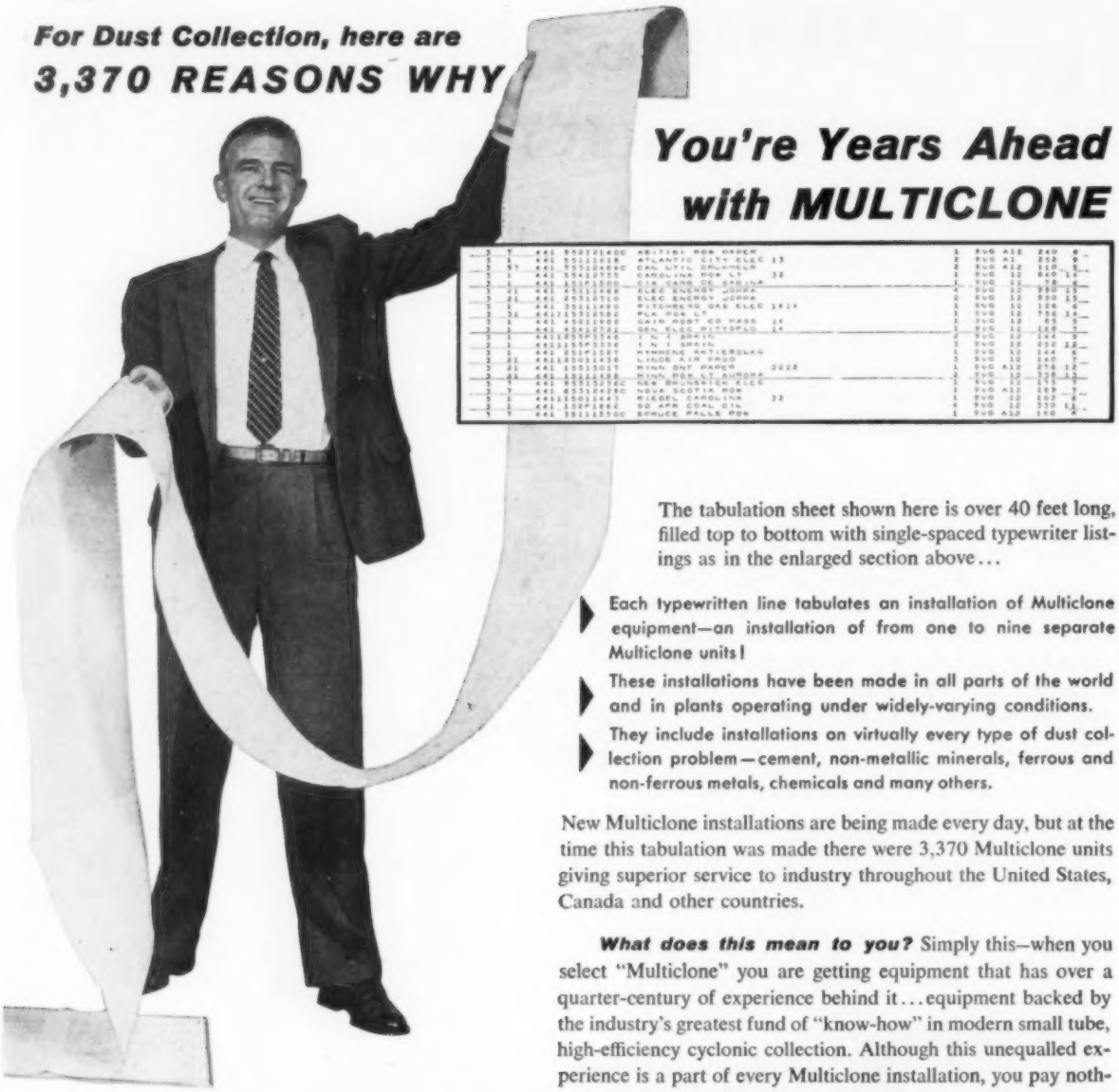
Combustion Engineering-Superheater Ltd., Montreal, Canada

For Dust Collection, here are

3,370 REASONS WHY

You're Years Ahead with MULTICLONE



The tabulation sheet shown here is over 40 feet long, filled top to bottom with single-spaced typewriter listings as in the enlarged section above...

- Each typewritten line tabulates an installation of Multiclone equipment—an installation of from one to nine separate Multiclone units!
- These installations have been made in all parts of the world and in plants operating under widely-varying conditions.
- They include installations on virtually every type of dust collection problem—cement, non-metallic minerals, ferrous and non-ferrous metals, chemicals and many others.

New Multiclone installations are being made every day, but at the time this tabulation was made there were 3,370 Multiclone units giving superior service to industry throughout the United States, Canada and other countries.

What does this mean to you? Simply this—when you select "Multiclone" you are getting equipment that has over a quarter-century of experience behind it...equipment backed by the industry's greatest fund of "know-how" in modern small tube, high-efficiency cyclonic collection. Although this unequalled experience is a part of every Multiclone installation, you pay nothing extra for this vital advantage!

Send For Descriptive Literature on Multiclone Equipment!

COTTRELL Electrical Precipitators
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Precipitation Company of Canada Ltd., Dominion Square Building, Montreal

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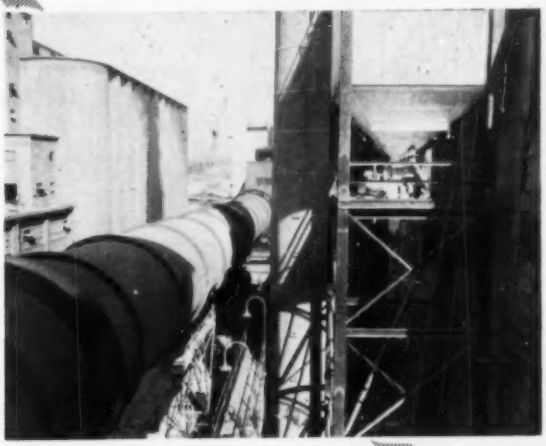
MACDONALD Service → Continuity

From Detail Design to Production



12′ x 450′ Kiln

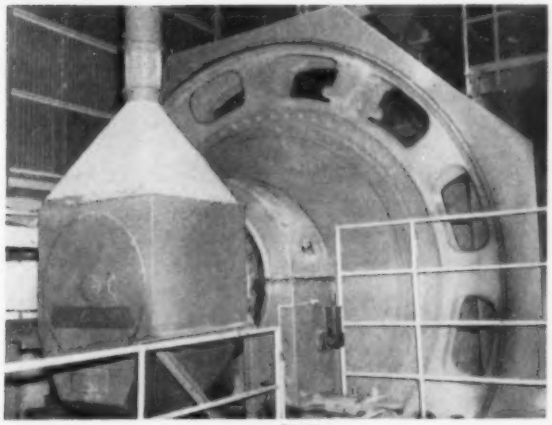
The extent of MACDONALD Service is demonstrated by the plant expansion program recently completed for the Columbia Cement Division of Pittsburgh Plate Glass Company in Zanesville, Ohio.

Starting with detail design in cooperation with Columbia Cement personnel, MACDONALD was responsible for the complete development, including electrical layout and mechanical installations. Original plant capacity has been increased by 60%.

Consult

MACDONALD

when considering plant expansion or new plant construction



Finish Mill

Slurry Basin

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Cement Producers select

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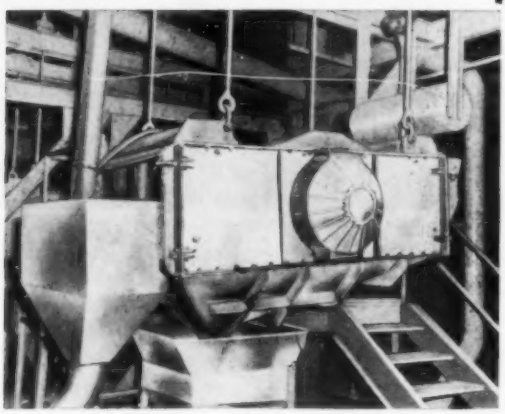
VIBRATING SCREENS

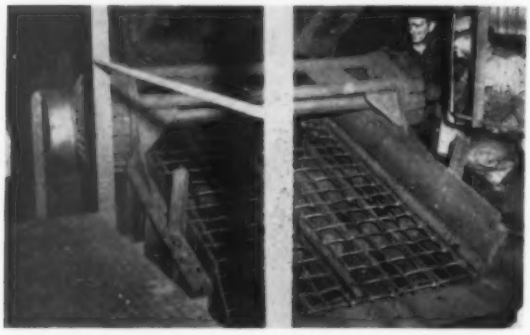
for superior performance



Suspended Gyroset 3' x 6' scalping oyster lime slurry at 1/8" opening. Baton Rouge Plant, Ideal Cement Co.

Check these features of GYROSET SCREENS

- ✓ Positive Eccentric Action
- ✓ Positive Stroke Adjustment
- ✓ Only 2 Bearings
- ✓ Heavy Structural Shaft Housing
- ✓ Center line of bearing fly wheel moved 2" closer to side sheets for less overhang.
- ✓ Taper lock fly wheel bushing for assured tightness and ease of removal.



5' x 8' special scalping screen with abrasion resistant liners—5" opening.

YOUR cement plant will reach peak sizing efficiency when "GYROSETS" handle the screening jobs.

Positive eccentric action of these units imparts a full circle throw over length and breadth of screen surface. Being of the two-bearing action, the eccentric action is obtained with fewest moving parts.

GYROSET Screens are equally effective for sizing, scalping or de-watering. Action easily adjustable for record output in rough scalping, or can be set for top efficiency in grading or de-watering, with capacity exceeding any other scalping unit. GYROSETS can operate at high speeds and at any degree of pitch (or slope).

Construction is simple, but allows flexibility in action. Sizes from 18" to 72" wide and 4' to 16' long, one to three decks.

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Thor has rock drills for every job—every budget

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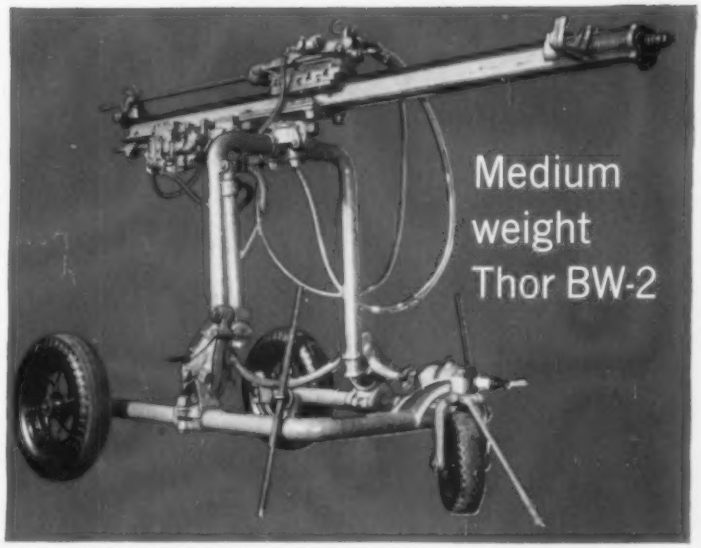
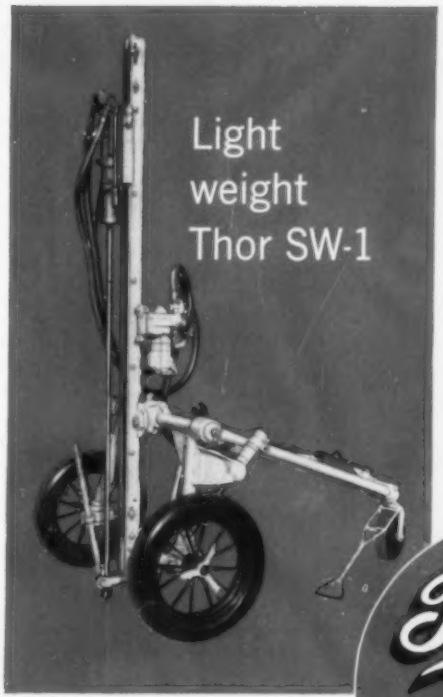
Thor's super-powered 105M drifter rock drill • Rugged Thor BW-2 wagon drill mast and air feed motor • Self-propelled with two 7½ h.p. Eimco air motors, power aplenty to haul itself and air supply • Rigid frame, proved in tractor design, long-lasting, low maintenance • Aircraft-type accumulator in hydraulic system maintains complete rigidity • Simple hand-operated track take-up • No track locks required • Large flat platform, good for tool and fuel storages—ideal for operator when drilling toe holes.

Ask your Thor contractor tool distributor to demonstrate Thor's SW-1 and BW-2 wagon drills and the fabulous new Thor MM-2 Drillcat. Thor Power Tool Co., Prudential Plaza, Chicago 1, Ill.



THOR BW-2

The medium weight BW-2 comes equipped with Thor 4" bore drifter. Has 800 to 1000 lbs. pulling power for steel removal, a 5 h.p. rotary air motor, variable speed control.



THOR SW-1

Thor's lightweight SW-1 delivers real economy in rock drilling. When equipped with a 55 lb. sinker, its lower air requirement permits the use of a smaller capacity compressor. Thor's SW-1 drills holes in any direction, at any angle—on level or sloping ground. 3-wheel reinforced compact rig—wet or dry operation—mast swings 360° vertical or horizontal—handles up to 3½" bore drifter.

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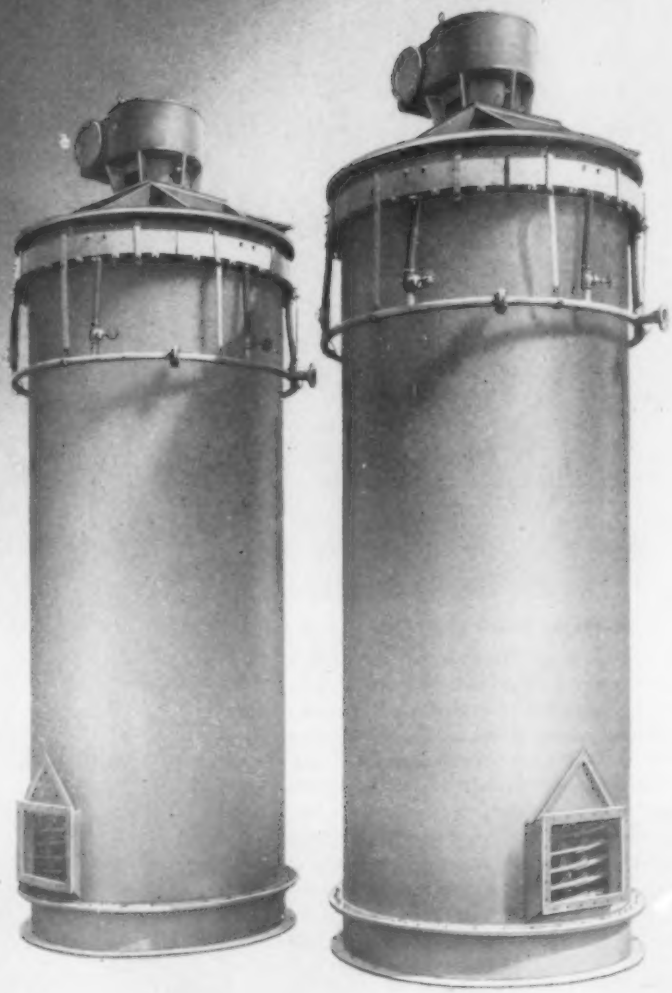
SMIDTH
cement coolers



The Smidth Cement Cooler, developed especially for cooling hot cement to temperatures acceptable for bulk shipment or immediate bagging, is externally water-cooled. The hot cement is introduced at the base and conveyed in a thin layer along the cooled interior surface to the top, where it is discharged. High cooling efficiency is assured by the intimate contact of cement and the water-cooled surface.

The Smidth Cooler may also be used with many other similar dry pulverized materials.

Illustrated here are two 8' dia. x 17' 7" Ash Smidth Coolers ready for shipment.

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Engineers and Machinery Manufacturers
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F. L. Smidth & Cie France
80 Rue Taitbout
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F. L. Smidth & Co. of Canada, Ltd.
11 West 42nd Street
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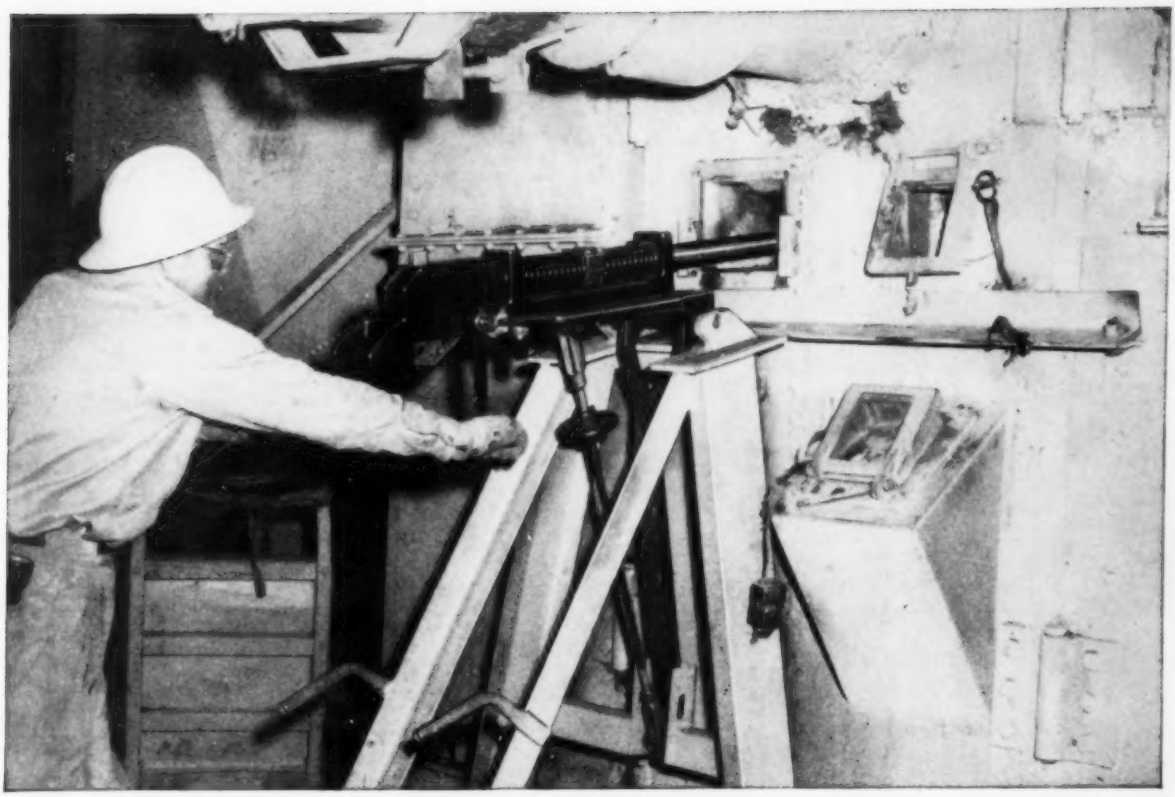
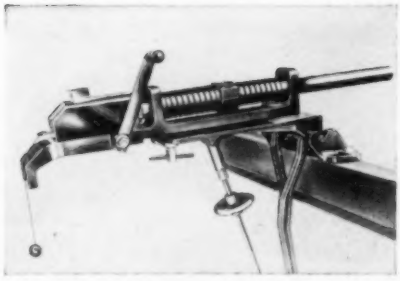
F. L. Smidth & Co. (Bombay) Private Ltd.
42 Queen's Road
Bombay, India



Here's the easy, cost-saving way to remove Clinker Rings—



WITHSTANDS HIGH TEMPERATURES AT KILN HOOD. Special steels and castings enable the Remington Industrial Gun to operate safely at kiln hood temperatures. Gun is easily installed by attaching bolster to hood I-Beam or movable mount as shown.

Remington Industrial Gun

You save valuable man-hours in removing clinker rings with the hard-hitting Remington Industrial Gun. A pull of the gun's lanyard does the work of many sledge hammers... brings rings and other troublesome kiln formations down in minutes!

No need to wait until kiln cools off. In fact, you don't have to turn off flame or stop rotation until you're ready to shoot. Then just load . . . aim at ring juncture and BAM—the 9,000 ft.-lbs. of knockdown power from a Remington Industrial Magnum* shell smash into the ring! It takes only a short time to dislodge it—without damage to kiln or lining—and you're quickly back on full-time schedule.

Here's proof: One Georgia refractory saved 222 man-hours and gained 26 hours' production time per month with this easy-to-use, one-man tool. So don't let clinker rings "bottle-neck" your plant, let the Remington Industrial Gun cut downtime to a minimum. Just clip and mail coupon for our illustrated, fact-filled folder.

** For shorter kilns, Remington Standard Industrial Shells fill the bill. 7,500 ft.-lbs. of energy are delivered!*

Remington

DUPONT

Remington also manufactures the Model 455 and "Mighty-Mite" Stud Drivers for instant fastening into concrete or steel.

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Please send me your free booklet which shows how the Remington Industrial Gun speeds removal of clinker rings.

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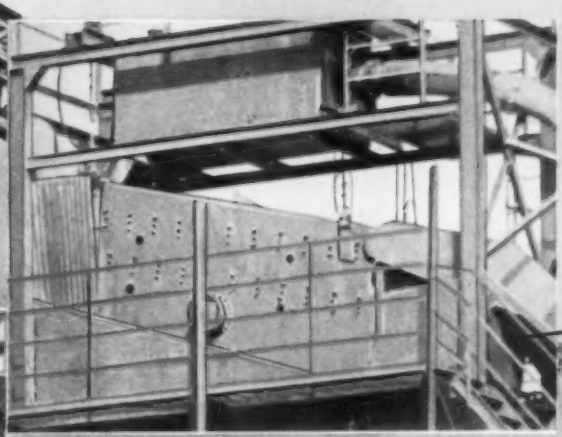
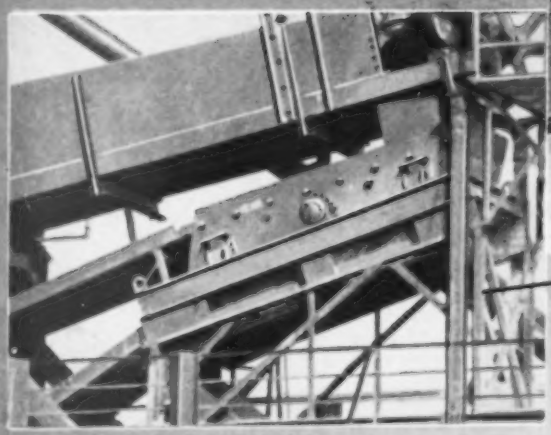
FAST, ACCURATE AND SIMPLICITY AGGREGATE

Material received by the pump box drops to the 4′ x 12′ Model M-11 Simplifio triple deck screen. The top deck is equipped with 2″ square openings. The oversize is chuted into a separate bin. Due to the nature of the deposit there is no need for a crusher, and what oversize accumulates is sold for fill uses. The second deck is equipped with a ⅜″ sq. opening. This deposit produces a large amount of pea gravel, and the excess which cannot be combined into concrete aggregates is chuted to another bin. All other materials between the first and third decks is passed onto the logwasher where it is thoroughly cleaned.





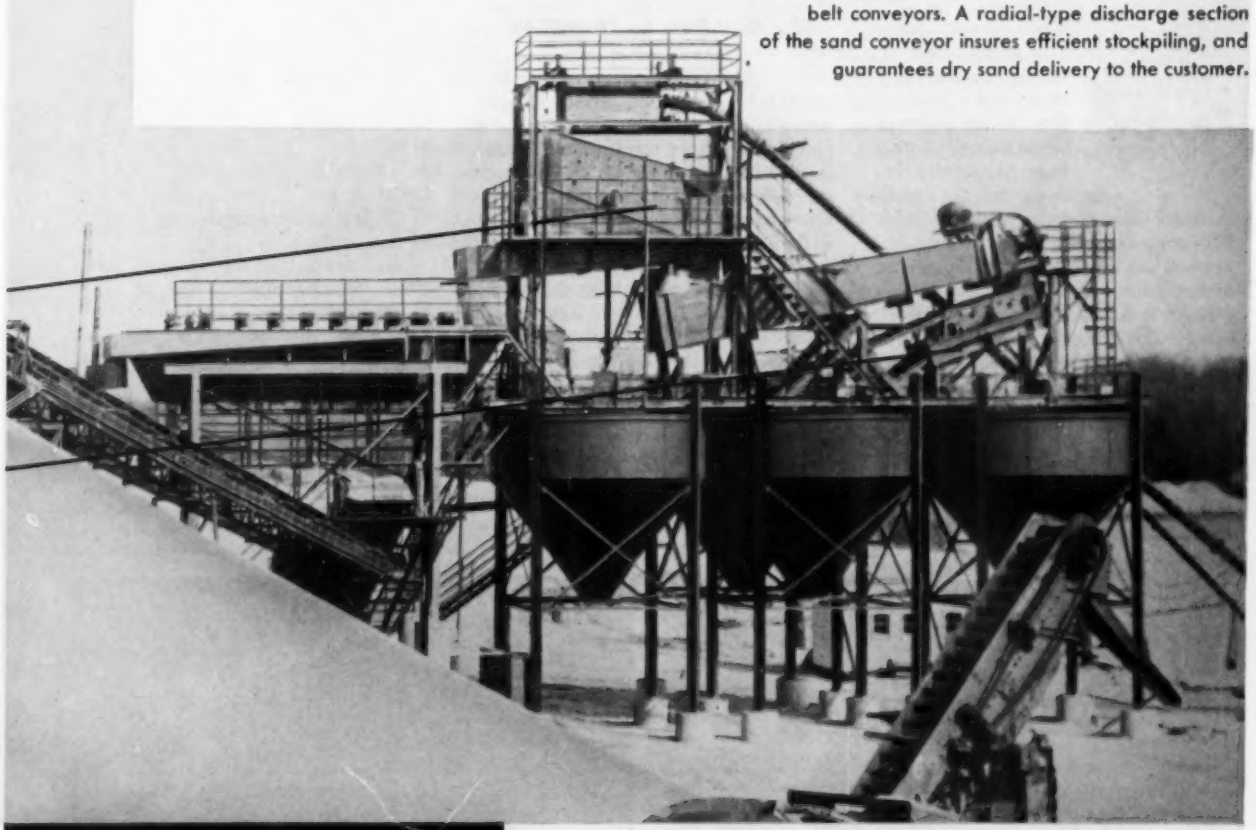
In the final phase of processing aggregates discharge from the logwasher onto a 4′ x 8′ Model 8O triple deck unit. Here the final rinsing and sizing takes place. The top deck, 1¾″ sq. opening, splits the aggregate into two concrete specifications. The second deck openings are used to assist in making any unusual gradations, but primarily to lighten the load on the third deck where small opening screen cloth eliminates the broken soft stone, coal, and slate degradation. • Write today for Catalogs #531 and #571. • SIMPLICITY equipment can increase production in your plant.

Simplicity
TRADE MARK REGISTERED
ENGINEERING COMPANY • DURAND 12, MICHIGAN

PROFITABLE SIZING WITH SCREENS

Production—125 tons/hour—with Simplicity equipment at one of the dredging operations of Boichot Concrete Products Corp., Lansing, Michigan—Louis and Donald Boichot, owners.

Averaging 125 tons hourly—with production peaks as high as 150 t.p.h.—Simplicity screens produce accurately sized aggregates and washed sand at a large dredging operation of the Boichot Concrete Products Corp. of Lansing, Mich. The 8" pump, equipped with both a 10" intake and 10" discharge, delivers material 6" x 0 to a 4' x 12' M-11 triple deck screen. This unit scalps off the oversize stone, and screens all sand through a 3/16" opening screen cloth. The sized aggregate is passed through a 30' long twin log-washer, where it is thoroughly cleaned. In turn the aggregate is discharged onto a 4' x 8' model BG triple deck screen for rinsing and final sizing. The sand is flumed from the 4' x 12' screen to a 32' long electrically-operated purging tank, where initial dewatering of sand occurs. Sand is then introduced into two sand screw classifiers from the purging tank and passes to a stockpile via belt conveyors. A radial-type discharge section of the sand conveyor insures efficient stockpiling, and guarantees dry sand delivery to the customer.



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FOR CANADA: Simplicity Materials Handling Limited, Guelph, Ontario.
FOR EXPORT: Brown and Sites, 50 Church St., New York 7, N.Y.

Write for new Simplicity Screen Cloth Catalog #67. Tells you all you'll need to know in ordering woven wire screen cloth. Immediate delivery from Simplicity's huge stock of fine quality cloth.

201

United Cement Company

Alabama's Newest Lime Plant

producing quicklime and agstone, hydrate next

By WALTER E. TRAUFFER

THE latest addition to the lime industry is the new rotary kiln plant of the United Cement Company, Inc., near Montevallo, Ala., in the well-known Calera lime district. This 225-ton-per-day plant went into operation on August 1, 1956, on an intermittent schedule while a market for its quicklime was being developed. The Dallock Corporation of New York, lime distributors and technical advisers, was employed as consultants to assist in developing the quicklime market.

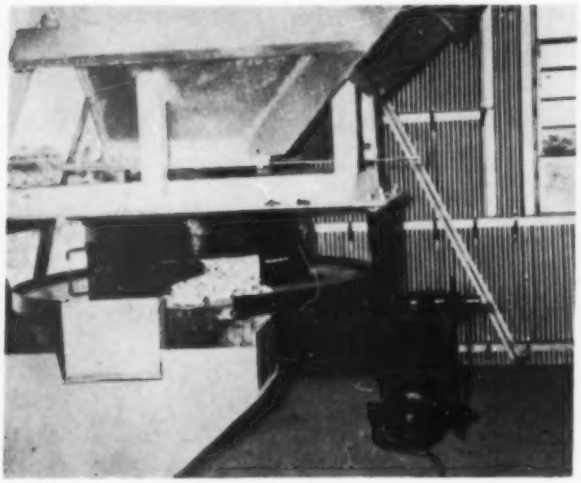
A hydrating department with a capacity of 6 to 8 t.p.h. is now being built. Agricultural limestone is being made from the fines not usable in the kiln at the rate of 250 tons daily. The quicklime produced is characteristic of this area, being firm, with little dusting, yet quick slaking and slow setting.

The idea of building this plant was conceived by a small group of native Alabamans and their friends, headed by John R. Dyas of Mobile, Ala. They were successful in raising the necessary initial capital and incorporated in July, 1955, under Alabama law for the manufacture of lime and cement.

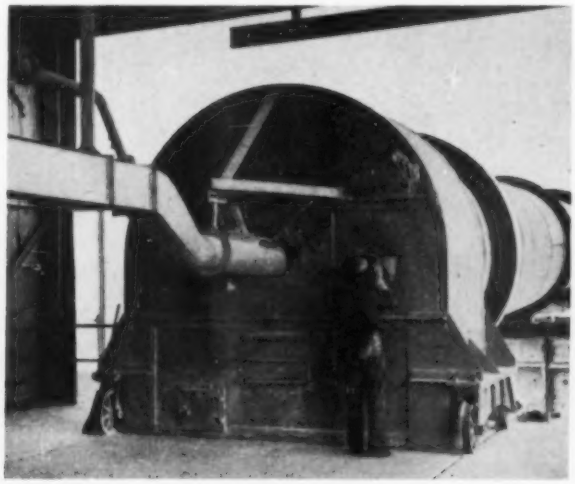
Then began the selection of a plant site from a number under consideration. The site chosen is on State Highway No. 25, about midway between Calera and Montevallo, on the Southern Railway. It is about 2 miles west of Calera and 35 miles south of Birmingham. The plant is only ¼ mile from the geographical center of the state and is on the edge of one of the largest lime producing districts in this country.

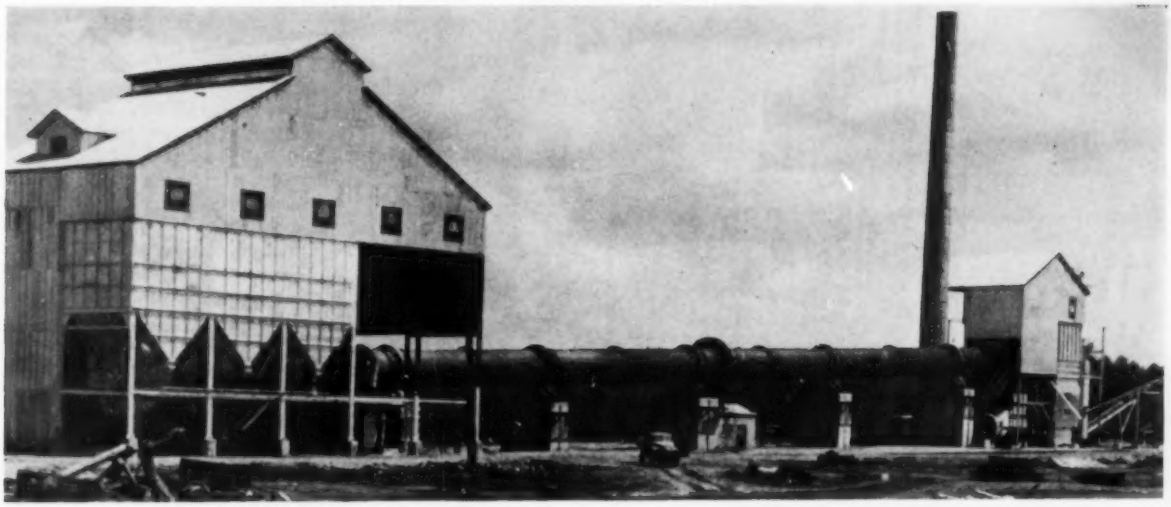
The deposit is the Newala limestone, which supplies several other plants in the area. A geological study was made and the entire 450-acre property was tested by Dr. Stewart A. Lloyd, a geologist with the University of Alabama. It was found to contain ample limestone for many years of operation, and there is also ample

One of the two table feeders which are synchronized with the kiln speed.



The kiln hood with burner pipe, which is adjustable for position and angle.





General view of plant with finished material bins at left and crushing department at right.

suitable shale for later cement manufacture.

It was decided to build a rotary cement plant later. Phillip J. Kyser, a lime and cement plant operator with long experience in this area, was brought in to design and build the plant, with the assistance of Garland K. Grace, now serving as plant superintendent and engineer. Later Mr. Kyser became president and general manager of the company. Other officers are John R. Dyas, chairman of the board; T. F. Dyas, vice-president; and Floyd H. Hawkins, secretary and treasurer. James T. Patrick is chief chemist, Richard H. Marshall is sales manager, and J. C. Gentle is in charge of agstone and crushed stone sales.

Removal of overburden from the deposit was begun immediately, as was also the designing of the plant, which was done with the co-operation of the manufacturers of the equipment. Ground was broken for the plant on December 1, 1955, and the first lime was produced on August 1, 1956. A few months later an agricultural limestone department, was added to dispose of the fines which cannot be used in the kiln. A hydrating, pulverizing, and bagging department is now under construction. Provisions were made in the plant design, power distribution system, etc., to take care of future expansion.

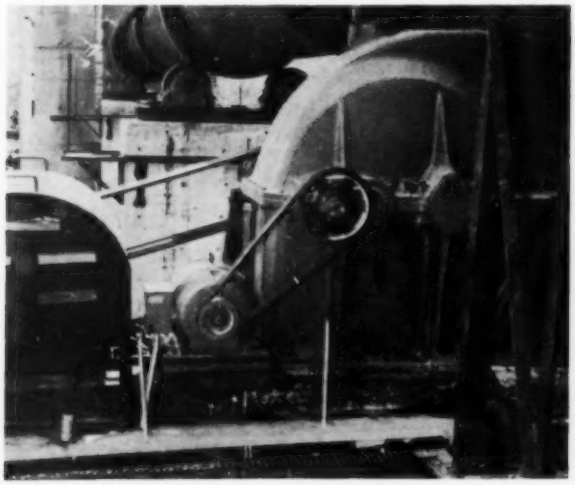
At the east end of the property there is Athens shale over the limestone; this is suitable for later use in cement manufacture. Under this shale is a 65-ft. bed of Newala high-calcium limestone which is 300 ft. wide and 1,500 ft. long, enough for many years of operation. Under and around the limestone is dolomite, which is also suitable for lime manufacture, and under the dolomite is more suitable limestone and dolomite in alternating beds.

The overburden averages 0 to 15 ft. in depth, and there are pockets and seams up to 25 ft. in depth. Once this material is removed, the stone is clean. A crane and shovel are used to remove the overburden and to develop the quarry. This work has progressed to the point where sufficient raw material is being obtained for production.

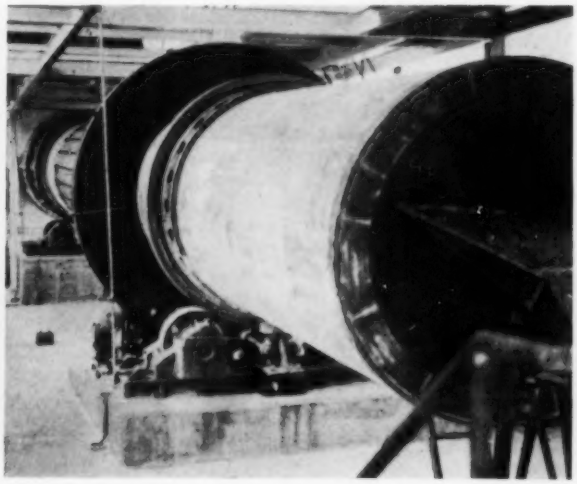
It is planned eventually to work 30-ft. faces on at least three levels, so that overburden removal can be kept ahead of quarrying. A temporary crusher setup is processing raw material at this time. Later a crusher will be installed in the quarry, with a conveyor out to the plant, replacing the present truck haulage.

Trucks now discharge the stone on an Austin-Western pan feeder ahead of the 24- by 42-in. Austin-Western primary jaw crusher. A bucket ele-

Kiln drive motor and gear reducer with frequency generator (below) which synchronizes feeder speed.



The 8 by 80-ft. rotary cooler, which is equipped with chrome steel lifters.



Another view of kiln, cooler, and stack showing loading bins in foreground.

vator feeds to a surge bin over a 30- by 33-in. Cedarapids hammermill. Another elevator feeds to a 4- by 12-ft. Link-Belt 3-deck screen, which can be equipped with any desired openings for kiln stone. Fines are conveyed to a truck- and car-loading bin for agstone. The two coarse sizes made are discharged into two 250-ton kiln-feed bins.

Under each feed bin is a 60-in. dia. table feeder which can be set for any desired rate of feed and which is synchronized with the kiln speed by a Katolite frequency generator on the kiln motor shaft. Each of these feeders discharges to a common bucket elevator and over a small screen with ¼-in. openings to take out any grit or impurities before it is discharged into the kiln feed spout.

The 9- by 300-ft. all-welded Vulcan rotary kiln is mounted on five rings and supporting rolls. It has a slope of ½ in. per foot and is driven at the rate of 75 r.p.h. by a 75-hp. General Electric variable speed a.c. motor through a Falk speed reducer and flexible coupling. An unusual feature is the auxiliary drive, which is large enough to keep the kiln turning at full speed in an emergency. This consists of a diesel engine driving a 75- k.v.-a. generator and connected by a double-throw switch. Experience has demonstrated that small auxiliary engines are hard to start when most needed in bad weather.

The kiln is lined with 6-in. brick and has special cast tail and nose rings. The burning zone is lined with 70 percent A.P. Green Cruzite and the balance with LaClede Christy 40 percent alumina.

Natural gas fuel is used, with a malleable iron burner pipe which is so arranged that it can be adjusted for position and angle. A primary air fan mixes gas and air and an adjustable gas jet in the pipe gives full control of the flame. A 30- to 40-ft. pencil flame has been found most effective, as it lengthens the calcining zone. Temperature in the burning zone is kept under 2,250 deg. F. and that in the feed end of the kiln ranges between 1,000 and 1,200 deg. With this 1,000 B.t.u. gas a fuel rate of less than 7,500,000 B.t.u. per ton is obtained. Even better results are expected when operations become more stabilized. Judging from experience, no serious ring trouble is expected.

The calcined lime is discharged from the kiln into the 8- by 80-ft. Vulcan rotary cooler equipped with horizontal chrome steel lifters which provide maximum aeration.

The hot air from the cooler goes *via* a 7½-hp. Sturtevant fan to the kiln as secondary air. The exit gases from the kiln go *via* a 60-hp. Sturtevant fan to the 140-ft. Ingalls steel stack. This is of the tapered self-supporting type and is 18 ft. in diameter at its base and 6 ft. at the top.

The entire kiln department is controlled from a main board on the kiln firing floor. Instruments include a Bristol gas flow meter with a Barton body, a Bristol recording pyrometer on the feed end, a Daniel orifice regulator for the gas, and a recording pyrometer for the exhaust gases at the fan. There are also controls for the cooler and for the kiln through an auxiliary wiring system.

The lime discharged from the cooler is elevated to a 3- by 10-ft. Seco 3-deck screen which makes four sizes of lump lime—⅝- to 1-in., ⅜- to ⅝-in., 3/16- to ⅜-in. and 3/16-minus. Decks can be changed to obtain different sizes. Two sizes are discharged direct, and two at one time on a single split conveyor, into four of six 125-ton bins. Space has been left for four additional bins. Direct car shipments are now being made to aluminum and steel plants, paper mills, and other industries, for water treatment, etc.

The hydrating department now being installed consists of a 5- by 20-ft. continuous hydrator and an 8-ft. Gayco separator from which tailings will go to a 50-in. Raymond roller mill. The mill and separator will also be used for pulverizing quicklime. There will be two St. Regis Type 107-FC 3-tube packers, one for quicklime and one for hydrate.

Electric power is purchased from the Alabama Power Company and is reduced at its substation from 44,000 to 440 v. Modern distribution panels are used, and the entire plant is served by an underground system with ample conduits for future expansion. Natural gas is purchased from the Southern Natural Gas Company through the town of Calera. Water is purchased from the town of Montevallo, which has springs of ample capacity to supply local industries.

It is planned to accumulate ground water in a reservoir to form a lake, to provide service water for operations and recreation for employees. Another step toward good neighbor relations is the planting of idle land in pine trees for the pulp industry. A well-equipped laboratory controls quality of both raw material and finished products.

The management has been fortunate in being able to hire experienced help. Because this area has always been a big lime producer, there was no problem in hiring men skilled in its production. Every effort has been made to provide for their comfort and convenience. On the premises also are modern offices, machine shops, etc.

After more than two years of effort to develop bauxite deposits in Haiti, Reynolds Haitian Mines, a subsidiary of the Reynolds Metal Company, made its first shipment of bauxite mined in Haiti. The U. S. firm made an investment of $8,000,000 in the Haitian project.

California led all the states in the use of portland cement in 1955—31,553,460 barrels. Texas ranked second with 20,781,217 barrels.—*The Dragon.*

Speakers at N.I.S.A. Meeting

Probe Industry Problems

By BUREN C. HEROD

THE 22nd annual meeting of the National Industrial Sand Association, held at The Homestead, Hot Springs, Va., May 14-17, maintained the established record of providing members with an informative program of discussion and talks on important problems and topics of interest to the industry.

In addition to business sessions of the board of directors, the schedule featured a wide range of subjects of direct concern to the producers, including *ex parte* proceedings, availability of rail freight equipment and other traffic problems, industrial hygiene, taxes, zoning, and economic developments. Among the prominent speakers were Ewan Clague, commissioner of labor statistics, Bureau of Labor Statistics, U. S. Department of Labor; Henry M. Wick Jr., Delisi & Wick, Pittsburgh, Pa., traffic counsel for N.I.S.A.; John T. Sapienza, Covington & Burling, Washington, D.C., association tax counsel; and Caleb R. Megee, Association of American Railroads, Washington, D.C.

During the general session, the association's three top officers—Emery M. Durstine (Keener Sand & Clay Co.), president; William J. Cannon (Nugent Sand Co.), vice-president; and Arthur B. Schlesinger (New Jersey Pulverizing Co.), treasurer—were re-elected to their respective posts for the coming year. The nominating committee, headed by George A. Thornton (Ottawa Silica Co.) also selected three mem-

Among the association officers and staff who played an important role in the success of the meeting are (l. to r.): Kenneth E. Tobin Jr., associate executive secretary; Arthur B. Schlesinger (New Jersey Pulverizing Co.), treasurer; William J. Woods Jr. (Pennsylvania Glass Sand Corp.), a new director; and Vincent P. Ahearn, N.I.S.A. executive secretary.

Henry M. Wick Jr. (Delisi & Wick, Pittsburgh, Pa.), traffic counsel, presented a review of developments in ex parte proceedings affecting the industrial sand industry.

An interesting discussion of the economic picture and background was given by Ewan Clague, commissioner of labor statistics, U. S. Department of Labor.

bers to fill board vacancies created through retirements pursuant to constitutional limitations on length of service. The three nominees who were elected to the board were Thomas H. Hardy (Hardy Sand Co.), Clarence H. Woods (Wedron Silica Co.), and William J. Woods Jr. (Pennsylvania Glass Sand Corp.).

Mr. Megee, vice-chairman of the car service division of the railroad assocaition, who has addressed N.I.S.A. meetings several times, made several pertinent comments on the transportation picture, and conveyed a note of optimism concerning the freight car situation this year.

A net gain of 23,000 new cars was realized by the end of 1956, which puts the railroads in a substantially better position than a year ago, it was noted. A capital expenditure of over $1,300,000,000 is expected to be recorded for new equipment during the coming year.

While industry in general should have no complaints on the availability of equipment this year, the speaker indicated industrial sand producers may find the gondola situation a little tight. However, it was pointed out that more boxcars should be available, and that the hopper car situation should also be better. Along that line, Mr. Megee noted that 38,000 hoppers cars and 12,000 gondolas are currently on order.

The speaker emphasized that a disturbing factor in the availability of rail cars is the increasing average period of car detention by consignees. It was stated that cars are in the possession of users about 51 percent of the time, and that the average 16-day turn-around at present results partly from the widespread 5-day work week, and also from the lack of storage space. These points have contributed to the 29 percent increase in demurrage assessment.

Legislative, judicial, and administrative developments in the federal tax program, as they affect the industry, were discussed by John T. Sapienza, association tax counsel. Among legislative proposals of interest are a bill covering the fiscal year taxpayers who cannot under the present law apply 1954 depletion rates in that year, and the current consideration of transportation tax. It was suggested that this tax may be subject to a gradual reduction prior to ultimate repeal.

With respect to the Treasury Department's regulations proposed last November, many industrial groups have offered strong protests on several points, and in view of the widespread opposition experienced in writing and oral hearings, the department will probably not have the final regulations out before next fall.

A brief discussion of industry reports to the U. S. Bureau of Mines was made by Kenneth E. Tobin Jr., of the association staff. The Bureau, it was noted, had recently followed the theory of classifying materials in accordance with their geologic occurrence, as opposed to the finished products derived from them. However, the agency has been prevailed upon to revert to classifying industrial sand with sand and gravel production reports, as formerly.

Industrial sand tonnage will be compiled by the Bureau, which has been requested to make a permanent stand on the procedure, from production reports on sand and gravel form No. 6-1273A submitted by the producers. The members were urged to request the latter form in the event they inadvertently received a different type, such as that for crushed sandstone.

Participation by N.I.S.A. in the Industrial Hygiene Foundation seminar (on dust control) held in Pittsburgh, Pa., on June 17-19, was discussed by Earle T. Andrews, (Pennsylvania Glass Sand Corp.), chairman of the advisory committee on health. A part of the program, it was noted, was to be built around questions furnished by producers. The suggestion was made in committee, Mr. Andrews stated, that industry members invite physicians who have conducted examinations of industry personnel. It was also suggested that safety may provide a strong point of interest at future seminars.

Arthur B. Schlesinger (New Jersey Pulverizing Co.), chairman of the committee on Navy sand blast specifications, reported on recent developments in that area. After a review of comments and information submitted by the industry, the Navy's Bureau of Ships, it was noted, has prepared a set of proposed specifications covering sand blast materials. When these are received, they will be distributed to the membership prior to a meeting of association representatives with officials of the Bureau of Ships for discussion of the final form of the specifications.

Recent traffic and transportation developments were reviewed by the traffic committee chairman, William J. Woods Jr. (Pennsylvania Glass Sand Corp.). Stating that the car supply appears to be adequate at the moment, Mr. Woods pointed out that the 23,000 net gain in cars for the 12 months ending April 1 should enable rail carriers to handle approximately 500,000 more carloads in 1957 than last year.

With respect to the 3 percent excise tax imposed on freight traffic during World War II, the speaker indicated that a concerted effort is being made by more than 100 national and regional groups to bring about repeal. It was noted that a considerable number of congressmen have indicated that they will support the repeal of this tax.

On the matter of the rail carriers' petition for higher freight rates under *Ex Parte 206*, Mr. Woods stated that the industry is taking a strong stand in opposition. It is generally felt, he said, that despite individual interests the industrial sand industry has a duty to its customers to voice objection to the petition for increased freight rates.

How the Turner Lime and Rock Quarry

BOOSTED PRODUCTION 50 PER CENT WITH CAT-BUILT UNITS

Here's the kind of success story that every pit and quarry owner should know about:

It began five years ago when Franklin Turner, owner of a lime and rock quarry in Shelbina, Mo., started standardizing on Caterpillar-built units. At that time, production ran 400 tons per 8-hour shift—in fact, 250 tons was considered satisfactory.

Today, with his operation standardized on Caterpillar-built equipment, *production is 600 tons per 8-hour shift.* No wonder Mr. Turner says, "I'm very well pleased with the high production capabilities of Caterpillar-built units—and their low cost of operation."

His quarry is about 2 acres in area and 100 ft. deep. Overburden runs from 20 to 25 ft. and is removed by the powerful new Caterpillar D7 Tractor with No. 7S Bulldozer shown at work above. Among other jobs, the easy-to-maneuver D7 levels dumped rock on the stockpile.

For loading purposes, Mr. Turner has a Cat-built Traxcavator*. Efficient CAT* Diesel Engines power his L50 Lorain crane, a Chicago-Pneumatic air compressor and a Dixie rock crusher.

Standardizing on Caterpillar-built products has meant much higher production and bigger profits for Franklin Turner.

Let your Caterpillar Dealer show you how it can mean exactly the same thing for you. He's got figures to show you, too, and he's ready to demonstrate his products right on your job. And after you buy, you can depend on him to protect your investment with prompt service and parts you can trust.

Caterpillar Tractor Co., Peoria, Illinois, U. S. A.

CATERPILLAR*

*Caterpillar, Cat and Traxcavator are Registered Trademarks of Caterpillar Tractor Co.

**WANTED—
THE HARD WORK**

The background of the industrial sand case in *Ex Parte 206* of the Interstate Commerce Commission, and developments up to the present, were discussed by Henry W. Wick Jr., who was engaged as association traffic counsel last fall. Mr. Wick pointed out that over a 10-year period the rail carriers had received a cumulative 118 percent increase in freight rates, and while these increases did not apply in full to industrial sand, nevertheless rates on this commodity did undergo a substantial rise. However, industrial sand prices rose only 55 percent from 1946 to 1955.

Mr. Wick noted that the failure of the commission to consider individual commodity groups carefully and the failure of the railroads to study the revenue contributions of commodity groups have made it difficult for the commission to arrive at an equitable conclusion in this case. It will therefore be hard to predict what the outcome might be. Such factors as rail earnings for the year and labor contracts are involved, and it is anticipated that the carriers will receive at least a 7 to 8 percent increase in rates.

While it is hoped that the commission will make a specific study of the effect on industrial sand in its determination of applicable rates, Mr. Wick indicated that the coal industry recorded vigorous opposition in three general rate increase cases prior to this one before special consideration was realized.

An interesting talk on *The Economic Outlook for 1957* was made by Ewan Clague, commissioner of labor statistics, U. S. Department of Labor. With a series of charts, Mr. Clague illustrated wholesale, food, and consumer price indices and their inter-relationships. With respect to the consumer price index, a rise in commodities was described as a factor in the increase of the index, which had been relatively steady for the last few years. Durables were recorded as stable until last year, when they took an upward turn, while shelter and services were illustrated as experiencing a long, steady climb.

Mr. Clague noted that while the index was not developed for that particular purpose, it has had a widespread effect on wages and labor negotiations. Approximately 4,000,000 workers were reportedly affected by the relating of wages to the index. It was emphasized that the development of the index is completely devoid of any manipulation, and that it represents a completely honest representation of the data collected throughout the country. This is in interesting contrast to some foreign countries, where an index is developed to conform to current political needs.

On the basis of the record provided since the indices were established, Mr. Clague voiced the opinion that a continuous round of inflation is not in the making, but that "corrections" such as were experienced in 1949 and 1954 are possible. Experience and economic stability are such that a repetition of the 1929 chaos is very improbable.

Community Planning as it Affects the Industrial Sand Industry was discussed by Sterling N. Farmer, Sand Products Corporation, Cleveland, Ohio. Citing the population growth, which is expected to expand from an estimated 169,000,000 of last year to 215,000,000 by 1975, Mr. Farmer pointed out that this growth is taking place largely in urban areas—areas where many of the industry's plants are now located.

A situation is rapidly developing in which the industry must take every opportunity to acquaint community planners and government officials at all levels of the importance of its products to the national economy, and thereby obviate the denial of critical mineral-bearing lands to future extractive programs.

Mr. Farmer described a series of meetings attended by representatives of the industrial sand industry, public utilities, community planners, and others concerned with community developments in northeastern Ohio. It was significant that those attending the meeting gained a greater understanding of the problems faced by each group; and a co-operative approach to solving the various factors was established. It was noted in particular that if public utilities are acquainted with the reserve problems facing the extractive industries, they will, when encountering deposits of materials, give this information to planners of communities where deposits are located and urge that consideration be given to the industry's needs.

Stating that community relations are of tremendous importance, Mr. Farmer emphasized that the magnitude of the problem cannot be overestimated. Producers must take an active interest in civic affairs, and should encourage employees to participate in community activities. This, it was pointed out, would lead toward a closer relationship between operator and community, and prove invaluable when common problems arise.

Zoning Problems of the Natural Resource Industries were comprehensively reviewed by Kenneth E. Tobin Jr., N.I.S.A. staff. In reference to community planning, which in the past has too frequently been lacking or haphazard, Mr. Tobin stated that if such projects were properly constituted and administered, the best interests of both the general public and the natural resources industries would be served.

Zoning problems are not of such a nature that they can be wholly eliminated by direct advertising or similar public relations efforts, it was noted. They should be approached with a program designed to align industry interests with community planning; thus zoning authorities will be acquainted with the fact that proper planning comprehends the interest of the community in the development of its natural resources.

The legal aspects of zoning were described as containing two points of basic concern to producers—pre-existing non-conforming use, and performance standards. While the first has in the past been generally left undisturbed by zoning authorities, the trend today was said to be toward setting a termination date for such uses. With respect to performance standards, the range of limitations that may be imposed on producers appears to be nearly unlimited. Such factors as noise, hours of operation, access, set-back from highways, fencing, rehabilitation, and dust control have come under widespread consideration by local zoning boards.

It is then evident, Mr. Tobin stated, that zoning promises to be the largest single problem that natural resources industries will face in the future. A long-range program designed to promote understanding and good will between producer and community is neded. Positive steps suggested for the producers included participation by plant executives in community affairs, efforts to make an operation as inoffensive as possible (before restrictions are threatened), and taking an active part in the formulation of zoning ordinances. With respect to the latter, in particular, the operator will have the opportunity to acquaint the authorities with the vital role played by industrial sand.

(*Continued on page* 186)

Dr. Lee C. Armstrong

A Vital Need—

Reserves of Limestone And Aggregates

By Dr. LEE C. ARMSTRONG
Chief Geologist
E. J. Longyear Company

ANOTHER P&D EXCLUSIVE

RAW material reserves will become of increasing concern to the cement and aggregate industries as the impact of the Federal-Aid Highway Act is felt in the years ahead. According to the Bureau of Public Roads, the 13-year road-building program will require some 1,400,000,000 barrels of cement and 9,700,000,000 tons of aggregates. Adding these figures to those for other construction, which many forecasters feel will continue generally upward, results in an impressive total representing an obligation, an opportunity, and a challenge to those who will be asked to supply materials, equipment, and talent. Yearly sales of many millions of barrels of portland cement and many more millions of tons of sand, gravel, crushed rock, and limestone will place a tremendous drain on known deposits. This leads to a sobering conclusion: that the success of the road building program and the welfare of the construction industry depends partly on *knowing the location, quality, and size of sufficient reserves* of these important materials.

The problem is an old one to several industries. The petroleum and mining industries, for example, depend heavily on continuous exploration to locate and define new reserves of oil and ores which can be tapped when their present sources are depleted. This advance exploration permits long-range planning continuous, uninterrupted operation.

Like these other industries, the cement and aggregate industries can predict the demand for their output with reasonable accuracy. The next step is to assess known reserves, and then, if necessary, to begin a continuing program to find adequate reserves for a sustained operation.

Exploration may consist of three or four efforts: the use of existing maps and reports; photogeology to locate areas of promise; field investigations by qualified geologists; and finally, test pitting and/or diamond core drilling. Geophysical methods also may be of assistance in some cases as a prelude to employment of more definitive methods.

Assistance in the search for cement and aggregate raw materials is available from several sources. Maps and reports published by federal and state geological surveys, as

Modern, high-capacity equipment speeds the removal of large quantities of materials for construction and road building programs. With hundreds or thousands of tons removed per hour, operations move rapidly, continually altering the scene. The importance of adequate reserves is pointed up by the increasing demand for raw materials.

well as articles in trade and professional publications, contain much information of value in the planning and execution of an exploration venture.

The venturers, in many cases, will also find it advantageous to avail themselves of the services of federal, state or private geologists familiar with the technical and financial aspects of the cement and aggregate industries.

Such professionals, making full use of the existing maps and literature, can serve not only in defining target areas where prospects of success are the best, but in eliminating large areas having little or no promise of reward.

Photogeology is a rather new tool that can be used to help in the selection of likely areas. In this approach, aerial photographs of a relatively large region are obtained and viewed stereoscopically. Physiographic, vegetational, and other features are examined and related to geological formations and structures. Then interpretational maps are drawn, and conclusions on the type of resources are submitted. Inasmuch as aerial photographic coverage of much of the nation is available and can be obtained at reasonable cost from various government agencies, photogeological appraisal is often a valuable first step in the survey of an area for its stone and aggregate potential.

Limestone is a relatively widely distributed resource. The principal problem to the portland cement industry lies in the location of adequate supplies that are tolerably low in magnesia and favorably situated with respect to transportation and mining costs. Exploration for cement-grade limestone normally can be handled most effectively by geologists, preferably those acquainted with details of regional and local stratigraphy and structure. Sites selected for further attention, then, can be considered good risks deserving the greater expense entailed in the acquisition and evaluation of property.

Once the general location of a potentially important deposit of limestone has been determined, diamond drilling can be used to locate the stone, determine its quality, and define the limits of usable reserves. Core drilling services and equipment for this purpose are widely available.

Sand and gravel are comparatively widespread, but they are bulky, low-priced commodities that cannot be transported economically for any great distance. Their low tolerance for haulage charges and the growing list of specifications governing their use have increased the difficulty of uncovering workable deposits.

Supplies of acceptable sand and gravel are being enlarged by beneficiation of marginal material, by new sources, and by extensions of known deposits. In places where a favorable differential in haulage rates shields against competition from higher grade but more distant deposits, marginal material has been made available by employing such methods as heavy media or jigging to remove light deleterious elements like shale and coal.

In most instances, however, expansion of reserves will be accomplished by finding a better class of material that can be made marketable by the less costly and more common methods, including washing, screening and classifying. Attention will be directed toward proving both large deposits capable of supporting large centralized operations, and smaller deposits advantageously. Disposed along right-of-ways which permit contractors to satisfy local commitments with the aid of portable plants.

Geologists qualified in the search for gravel and sand are those with an understanding of the aggregate business and the ability to recognize and judge the prospective value of the various gravel-bearing land forms. The features which they would identify as being most likely to prove fruitful are alluvial terraces and flats along major streams, alluvial fans below points where high-gradient drainage courses enter flatter terrain, and beaches along present or abandoned lake and marine shorelines.

In the northern glaciated states geologists' surveys would be broadened to include a search for such land forms as outwash plains, commonly made up of sand and gravel beds deposited by streams that issued from an ice front; eskers comprised of sinuous and gravel ridge marking the course of super or englacial rivers; kames, or gravelly hollocks formed where streams discharged over the edge of an ice sheet; pockets of sand and gravel in areas of terminal and ground moraines; and abandoned beaches along the shores of glacial-age lakes.

In conclusion it is felt that, while the consumption of cement and aggregates will be high, reserves of raw materials for these industries can be maintained at a generally adequate level. With the use of available prospecting personnel, methods and tools, there should be sufficient materials to meet the demands of the expanded highway construction program, as well as to supply old and new customers in other branches of the building business.

N.I.S.A.

(*From page* 184)

It was noted that the producer's personal attitude may then be the key to the zoning question.

Prior to adjournment of the general meeting, Vincent P. Ahearn, association executive secretary, presented another of his popular reports on the Washington scene. With comments on budget developments, cabinet personnel, taxes, and the current widely-publicized difficulties of certain labor figures, Mr. Ahearn had a wealth of material from which to draw for an interesting report.

The fall meeting of the association, at the Greenbrier, White Sulphur Springs, W. Va., is scheduled for October 15 to 18. At the next board meeting, consideration will be given to Key Biscayne, Fla., and Pebble Beach, Calif., as possible sites for future spring and fall meetings.

Washington News

(*From page* 12)

The same Justice Burton, who dissented in the previously discussed case, wrote in his opinion in this case that the provisions in the law were not "designed to permit the averaging of the pre-merger losses of one business with the post-merger income of some other business which had been operated and taxed separately before the merger." He went on to say that nothing in the provision of the law "suggest that they should be construed to give a windfall to a taxpayer who happens to have merged with other corporations. The purpose of these provisions is not to give a merged taxpayer a tax advantageous over others who have not merged."

This seems to be very clear-cut language, which puts the Supreme Court directly on record against mergers which have as their obvious purpose the acquisition of a tax loss. Such transactions now become exceedingly risky, indeed. It appears to leave only one narrow situation in which merging with a "loss" corporation could yield a tax advantage: when both parties to the merger are in precisely the same business and the merged corporation has almost the identical corporate structure as the pre-merged corporations.

This is one of three 190-B shovels used to load out limestone from Presque Isle Corporation's quarry at its Stoneport location.

Here is Presque Isle Corporation's loading site at Alpena, Mich.

In Michigan . . . and the world over

WHERE DEPENDABILITY IS ESSENTIAL BUCYRUS-ERIES ARE FAVORITES

The entire production of the Presque Isle Corporation's limestone quarry and crushing plant is transported by boat. Consequently, operation of the 1740-ton-per-hour plant is limited to the length of the shipping season on Lake Huron. To keep its Stoneport (Mich.) operation going at full capacity during this shortened working season, the company uses three Bucyrus-Erie 8-yd. 190-B electric shovels.

The high output of the three Bucyrus-Erie Ward Leonard electric shovels keeps quarry production ahead of plant capacity . . . all season long. If sustained high output is essential to *your* operations, investigate this outstanding line of heavy-duty excavators.

127L57C

A Familiar Sign BUCYRUS ERIE *at the Scene of Progress*

BUCYRUS-ERIE COMPANY • South Milwaukee, Wisconsin

Prominent Southern Firm

Meets Expanding Market With New Quarry, Plant

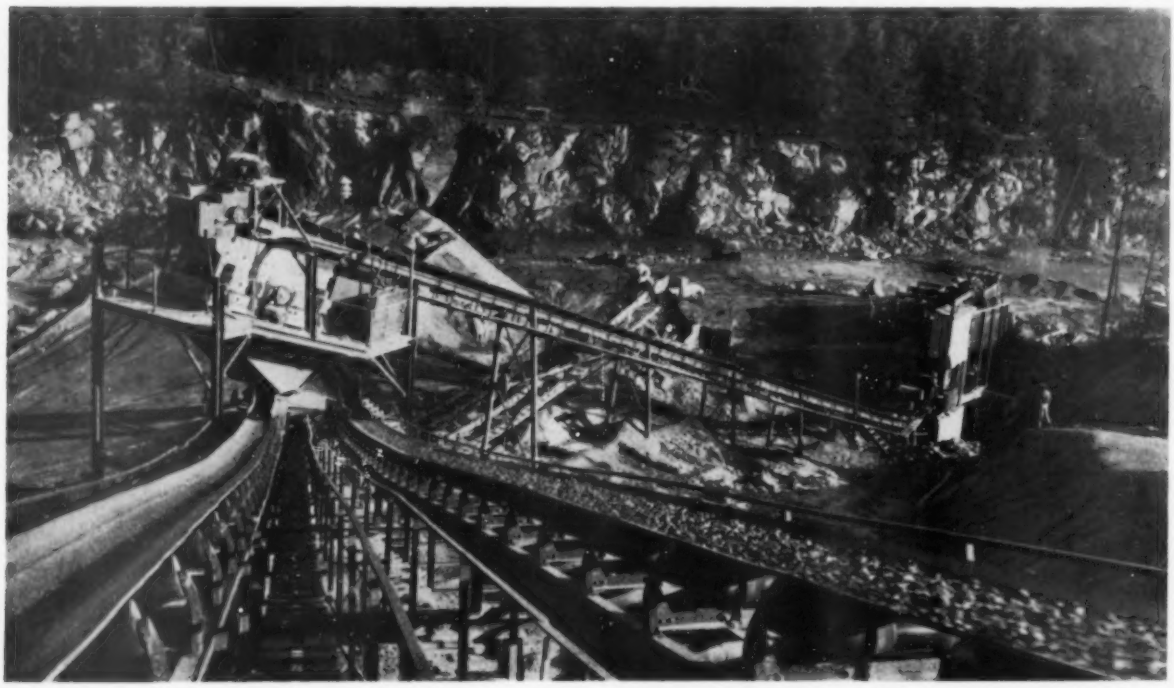
By BUREN C. HEROD

ALREADY an important producer with four quarries and twelve sand and gravel operations in Virginia and North Carolina, the Bryan Rock and Sand Company, Raleigh, N. C., recently initiated production from a fifth quarry near Elm City, N. C., in the northeastern part of the state.

Located near highway 301 between Rocky Mount and Wilson, the new 250-t.p.h. plant was erected to meet contract requirements for a supply of aggregates for construction on a reactivated Air Force base in the area, as well as the needs of the expanding commercial and highway construction markets.

The present quarry operations were started on a site which, in the hands of a predecessor company, had been active many years ago and was shut down in 1928. Situated on a 25-acre tract in an area that is predominantly underlain by biotite granite, with some occurrences of basalt, the older quarry section was dewatered by pumping starting in May, 1955. Erection of the new plant got under way at the same time, and in October of that year, the facility was in production.

The project was initiated and completed entirely by company personnel, construction being carried out by the local crew on a design developed by John Holding, company engineer. While the new plant has been in operation less than two years, steps have already been taken to expand and improve the secondary crushing, screening, and finished product stockpiling phases. These steps provide for the simultaneous production of both



An overall view of the new Elm City, N. C., plant and quarry of Bryan Rock and Sand Co.

crusher run material and screened, washed products. At first, with the exception of ballast materials, the two were processed separately. As these changes were just being made when this plant was visited, the original flow sheet is first described, followed by a description of the revised flow and new equipment. Output now is about 175 t.p.h. of No. 11 stone for surface treatment and 75 t.p.h. of 1½-in. R.O.C. for base treatment.

Averaging 24 on the Los Angeles abrasion test, the crushed granite produced has no difficulty in meeting all state specifications on aggregates. Due to the factors of greater jointing and fissuring in the upper areas of the quarry section currently being worked, rock from those areas contains a certain amount of detritus not found in the lower, less jointed mass. This upper rock is shot down separately and put through the plant as crusher run material while, for production of "clean" stone, the material from the lower face is processed alone.

The thin overburden covering the granite is removed by a Bucyrus-Erie 22-B dragline. Primary drilling is accomplished with a pair of Gardner-Denver Air-Trac drills mounting 3½-in. Brunner & Lay Rok-Bits on 1½-in. drill steel. Air is supplied to these units by Ingersoll-Rand 600-ft. and Chicago-Pneumatic 600-ft. compressors. Up to five rows of 30-ft. holes are drilled on an 8- by 8-ft. spacing, and are charged with Hercules 40 percent explosive. Primacord millisecond No. 9 connectors are used for detonation. The average shot is about 100 holes and uses about 5,000 lb. of explosive. Rock yield averages about 2½ tons per lb. of explosive consumed.

Broken rock is loaded by the quarry shovel—a diesel-powered 2-cu. yd. Bucyrus-Erie 51-B—into three 15-ton Euclid end-dump trucks for haul to a hopper at the primary crusher. Quarry-run material is delivered to the latter at the rate of about 250 t.p.h.

From the hopper, the rock is transferred on a 48-in. by 16-ft. 9-in. feeder to the 42- by 48-in. primary jaw crusher. These units, both Pioneer, are driven by 15- and 200-hp. motors, respectively. Westinghouse electric motors are used throughout the plant.

The primary crusher discharge is transported to a scalping screen on a 36-in. by 250-ft. inclined belt conveyor that is driven by a 40-hp. gearhead motor. As in the case of the other conveyors in the operation, it is equipped with Goodrich belting and Link-Belt idlers on company-built trusses. All screening equipment in the plant is manufactured by the W. S. Tyler Company, and is fitted with screencloth made by that firm.

A 5- by 14-ft. triple-deck unit, the scalper has 2-in., 1⅜-in., and ¼-in. openings on the top, middle, and bottom decks, respectively. Material retained on the top deck is chuted

Harry Helmer, left, is superintendent at Elm City. Pit operations are supervised by Ray Phipps, right.

This 2-cu. yd. shovel and 15-ton end-dump haulage trucks are used for loading and hauling broken granite to the primary crusher, background.

Dumped into the primary crusher hopper at the rate of 250 t.p.h., the rock is transferred to the crusher, lower right, on a 48-in. by 16-ft. 9-in. feeder.

Left: This 5- by 12-ft. double-deck washing screen is mounted over the "clean" stone compartment of the finished product bin. Water is supplied at 1,200 g.p.m.

Below: From the finished product bins, left, the materials may be transferred to outside storage on the radial stacker.

This machine and a clam-shell crane are used for loading both trucks and rail cars, as necessary.

to a Symons 4¼-ft. standard cone crusher, and that retained on the middle deck is fed to a 3-ft. Short Head. The larger of these secondary reduction units is driven by a 250-hp. motor, and the smaller by a 150-hp. unit.

Reduced to top sizes of about 1½- and ⅝-in. in the respective crushers, the products are discharged onto a 30-in. by 125-ft. belt conveyor driven by a 25-hp. gearhead motor and are returned to the scalper feed belt in closing the secondary crushing circuit.

Between the scalping screen tower and the washing screen tower next in the flow are two parallel and identical 30-in. by 135-ft. inclined belt conveyors known as C and D. When the material being processed is that removed from the upper part of the working face in the quarry, the rock retained on the ¼-in. bottom deck of the scalping screen passes *via* a flop gate to join the bottom deck throughs, and these two fractions are then transported on conveyor C to a screenings bin at the washing screen tower as crusher run product. Conveyor D does not operate for this flow except in special instances such as in the production of ballast.

For the clean stone flow, the fraction retained on the scalper's bottom deck bypasses the flop gate and is discharged to conveyor D, on which it is transported to the washing screen. The latter, a 5- by 12-ft. double-deck unit, has spray bars on both decks. These are supplied with wash water at the rate of about 1,200 g.p.m. by a 2,100 g.p.m. Fairbanks-Morse pump operating on a 110-ft. head.

Mounted above a 2-compartment bin of 175 tons total capacity, the washing screen discharges its entire product into the underlying washed material storage compartment. The adjoining compartment is supplied exclusively with screenings from conveyor C. Washed products account for approximately 80 percent of the plant output. Wash water and fines are flumed to a settling area near the plant site.

Washed aggregates and screenings can be drawn through clamshell gates from their respective compartments for discharge into cars on an underlying rail loading spur. In addition, *via* chutes from each compartment, the materials can be separately fed to the hopper of a 125-ft. radial stacker for outside stockpiling. From these stockpiles, the products are rehandled for truck or additional rail loadings by a Bucyrus-Erie clamshell

crane and an International-Drott skid-shovel. Depending on the material being processed, from three to five railroad gondolas can be loaded every hour.

Electric power for plant motors is brought into a substation at 2,300 v. This voltage is supplied directly to all motors exceeding 50 hp. on large equipment, while 220 v. from the substation is delivered to those motors of lower horsepower rating.

As noted above, the planned installation of new secondary crushing and screening equipment allowed the simultaneous production of both crusher run and clean stone, and freed the quarry shovel of the need for selective loading. Equipment added in accomplishing this revision includes a Nordberg-Symons 4-ft. Short-Head cone crusher and a Ty-Rock 5- by 14-ft. triple-deck screen.

In this flow, those fractions retained and passing the bottom deck of the scalper are continuously chuted to conveyor C as the crusher run material. That fraction retained on the middle deck, however, is fed to the new 4-ft. cone crusher. Discharge from the latter, along with that from the present 4¼-ft. unit—which is fed the rock from the scalper's top deck — is transported to the new triple-deck screen.

This screen is fitted with 1⅛-in., ¾- or ½-in., and No. 4-mesh screen cloth on the top, middle, and bottom decks, respectively. The top deck retained fraction is chuted to the new 4-ft. crusher, while that from the middle deck passes to the original 3-ft. reduction unit. Discharge from both crushers returns to the new screen in closing the secondary crushing circuit.

Plus No. 4 mesh material is chuted directly to conveyor D for transport to the washing screen, and the minus No. 4 is fed to conveyor C to join the crusher run product. The increasing demand for finer sizes in this area was an important factor leading to the expansion of capacity for fine reduction.

With respect to expansion of stockpiling operations, a 10-ft. diameter by 200-ft. reclaiming tunnel was constructed across the chord of the semi-circular stockpile placed by the stacker. Storage capacity is about 35,000 tons. From drawpoints in the tunnel below the respective material piles, the products are fed to a reclaiming conveyor and transported to a second stacker. The latter will accommodate additional loading of rail cars, as well as trucks.

While the entire plant output was formerly loaded in rail cars, with shipment originating on the Atlantic Coast Line R.R., a 50-ton Howe truck scale was recently installed to handle truck shipments destined for local markets and highway construction in the area.

Supervisory personnel of this expanding crushed granite operation include Harry Helmer, superintendent; Ray Phipps, pit foreman; Paul Burnette, plant foreman; and Theodore Ferrell, loading foreman. D. T. Bailey is general manager of the firm, which is owned by Mrs. Mary Bryan.

N. Y. Trap Rock Barge Captains Paid by Helicopter Delivery

The U.S. Marines have been long noted for their operations on land, on the sea, and in the air; but a progressive Eastern crushed stone producer has also gained recognition for peaceful activities in the same areas. Although the New York Trap Rock Corporation has for many years conducted quarrying operations along the Hudson River between Haverstraw and Clinton Point, and operates a fleet of 210 barges—the largest of its kind in the world—transporting crushed stone on the river, its air operations were only recently initiated.

From the standpoint of the firm's 100-odd barge captains, this has been particularly significant—they now have personal airmail delivery of their paychecks *via* the new company-owned and operated 47-G Bell helicopter, which was purchased in 1955.

Whereas in the past the captains often had to let their pay accumulate at the office if they were enroute on the river, Clyde Jordan, the company's flying cashier, now can land right on a barge in midstream. (Note also the floats for landing on water.) He can pay more than 60 percent of the captains in one day, compared to the 40 percent who received their checks on time. Turnaround time is reduced, since captains no longer need to leave their boats to pick up their checks at the New York office. Mr. Jordan is a member of Trap Rock's transportation department, and is in charge of hiring barge captains.

Based at its specially-built helicopter hangar at the Spring Valley Airport, the rotary-wing aircraft is piloted by C. William Barolet. (A full-time mechanic is employed at the airport to attend to the maintenance of the helicopter.) The craft usually catches up with moving tows —strings of as many as 21 loaded barges—between Nyack and Yonkers.

Other advantages of the helicopter are its utility in transporting personnel between the firm's five plants and in rushing machine parts to the various operations in emergencies.

Pay as you go—at the receiving end. Transportation of executives to the various operations, and quick delivery of machine parts are other assignments of New York Trap Rock's whirly-bird.

KOEHRING WORK CAPACITY *in action . . .*

A new 2-yard — Latest addition to the big Koehring line of excavators for mining and quarrying is this new 805. It's a heavy-duty 2-yard machine, with 25-foot deep-section shovel boom, and 18½-foot dual dipper sticks. You'll like the 805's power, strength, stability in heavy digging — and *extra capacity* as a dragline or crane for stripping, stockpiling, lifting. It handles 2 to 3-yard dragline bucket — lifts up to 52 tons.

"Diving" for gravel — Loading out of a water-filled gravel pit (right), this 405 dragline puts production on a big-tonnage basis. It has plenty of work-radius for this type of operation — can be used with 40 to 90 feet of boom, and handles 1 to 1½ cu. yd. bucket depending on weight of materials. Check its other work capacities on opposite page, then let your Koehring distributor show you what the 405 will do for you.

Re-working a slag bank — Once cast aside as waste, slag is now being reclaimed from this bank, run through a crusher, and used as sub-base material on road construction. During the process, slag is swept by a magnet to remove any scrap metal. Here, a Koehring 1½-yard 605 shovel loads the slag into Dumptors for haul to crushing plant. This combination of Koehring shovels and Dumptors makes a heavy-duty, high-production team. 6-yard Dumptor® climbs 24% grades fully loaded, dumps in one second, travels at same high speeds in either direction — no need to turn.

Mining copper ore — At this open-pit mine in the Southwest, overburden has been stripped down to pay-dirt. Next, a Koehring ½-yard 205 loads out copper-bearing ore for haul to smelter. Powerful crowd, fast retract, smooth swing, and instant dipper-trip speed production in the pit, keep trucks on the run.

Here are some figures that will interest you:

KOEHRING MODEL	SIZE DIPPER	LIFT CAPACITIES (Crawler ratings based on 75% of tipping load. Rubber-tired machines — 85% of tipping load.)	
205 CRAWLER	½-Yd.	20,000 lbs.	at 10-ft. radius
205 ON RUBBER	½-Yd.	30,000 lbs. 14,600 lbs.	at 12-ft. radius at 20-ft. radius
305 CRAWLER	¾-Yd.	30,000 lbs.	at 12-ft. radius
305 ON RUBBER	¾-Yd.	50,000 lbs. 15,800 lbs.	at 10-ft. radius at 30-ft. radius
405 CRAWLER	1-Yd.	40,000 lbs.	at 12-ft. radius
445 ON RUBBER	(Crane only)	90,000 lbs. 40,000 lbs.	at 15 ft. radius at 25-ft. radius
605 CRAWLER	1½-Yds.	72,300 lbs.	at 12-ft. radius
805 CRAWLER	2-Yds.	104,200 lbs.	at 12-ft. radius
1205 CRAWLER	3-Yds.	190,000 lbs.	at 12-ft. radius

Want more information? *See Koehring distributor.*

KOEHRING DIVISION OF KOEHRING COMPANY, Milwaukee 16, Wis.

K762

Canadian Institute Of Mining, Metallurgy Meeting Draws 1,850

THE annual meeting of the Canadian Institute of Mining and Metallurgy, held at the Chateau Laurier Hotel, Ottawa, Ont., April 22 to 24, attracted a record-breaking attendance of 1,850, including 530 ladies. The meeting was presided over by the president, Dr. J. F. Walker of Victoria, B. C., who at the conclusion of the sessions turned the presidency over to Dr. Horace J. Fraser, Falconbridge Nickel Mines Limited.

A feature of the meeting was the symposium on the St. Lawrence Seaway and Power Projects. Describing the projects as gigantic in conception and magnificent in execution, speakers at the symposium referred to the excavation work in the Canadian section as one of Canada's biggest mining undertakings. At present the total value of Canadian construction equipment on the job is approximately $75,000,000. Villages are being removed to new locations, and highways and railways are being re-routed. Many houses are being transported to the new locations by powerful machines. The heaviest yet moved is a 150-year-old tavern weighing 275 tons.

A part of the rock excavated for the seaway is sandstone so difficult to drill that at the Beauharnois locks the hardest of steel bits were good for only from 8 to 10 ft., and the steel teeth of excavators lasted only 8 hours. Costs mounted and work schedules fell behind until a jet piercer developed by Linde Air Products was employed. This machine utilizes an oil jet in conjunction with oxygen. The jet, operating at temperatures in excess of 4,000 deg. F. bites into the sandstone at the rate of 45 f.p.h. Holes 6 in. in diameter have been drilled to depths of 150 ft., and chambers for blasting can be burned out at the bottom.

At the end of the convention, tours were arranged to view the Seaway project.

Greetings to the C.I.M. from its sister society, the American Institute of Mining, Metallurgical and Petroleum Engineers, were brought by Grover Holt, president of A.I.M.E.

In addressing the gathering at the welcoming luncheon, the Hon. George Prudham, Minister of Mines and Technical Surveys, stated that Canada's output of all minerals may be expected to reach $3,000,000,000 annually by 1960.

Dr. W. A. Mackintosh, vice-chancellor and principal of Queen's University, was the guest speaker at the annual banquet. He said that although the need for new and additional capital is not to be minimized and there should be no limitation placed by Canada on investments from other countries, Canada's greatest need is not capital but a greater educational effort to turn out more university graduates in engineering and science.

Among the technical papers presented at the meeting were a number of interest to those engaged in the field of industrial minerals.

A paper entitled *Milling and Process Methods of American Nepheline Limited* by J. J. Mather, chief engineer, and H. Maidment, process engineer, traced the growth of nepheline syenite as a ceramic material since 1933, when the company was founded. From the initial 30 tons of material processed and distributed to the ceramic industry in Canada and the United States for test purposes in 1935, the industry has grown to the extent that a new 600 t.p.d. mill is now in operation, making 11 different products.

Detailed descriptions were given of the deposit, the quarry, and the new mill. In addition to the magnetic drums and high-intensity mag-

M. F. Goudge, chief, Industrial Minerals Division, Ottawa, Ont.

V. A. Haw, who discussed concrete aggregate production.

netic drums and high-intensity magnetic separators used in freeing the nepheline syenite from iron, a feature of the mill is the fluid energy grinding system which is believed to be unique in Canadian milling practice. In this system the abrasive nepheline syenite is ground, so that 100 percent will pass a 325-mesh screen, by using compressed air heated to 800 deg. F. to circulate the material at supersonic velocity in a doughnut-shaped chamber. Reduction is accomplished through impact of the particles with each other and with the walls of the chamber.

R. J. Merrill, manager, Carey-Canadian Mines Limited at East Broughton, Quebec, in his paper *The Carey-Canadian Asbestos Deposit* described how the new asbestos deposit of his company was discovered beneath a heavy mantle of glacial boulder clay through a magnetometer survey, followed by diamond drilling and sampling.

The problem of recovering core from the soft, broken up serpentine rock in which the asbestos occurs was solved by using "A" equipment with a non-rotating type of core barrel. Since the asbestos in this deposit is of the slip-fiber type and not the usual cross-fiber variety, the standard method of measuring the asbestos veins intersected by the core and calculating the asbestos content was not applicable, and a small mill had to be built in which to mill the core for recovery of the asbestos for evaluation. Milling of the cores was followed by the milling of bulk samples of 5,000 tons. In this way a deposit containing 50,000,000 tons mineable by open-pit methods was delineated. A mill of 2,000 t.p.d. capacity being built at East Broughton will soon be in operation.

V. A. Haw, of the Industrial Minerals Division, Ottawa, in his paper *Concrete Aggregate Production*, discussed the design of plants for the production of concrete aggregate, and mentioned factors influencing such design. Plants producing fine and coarse aggregate for the St. Lawrence Seaway and power project were described, and some of the problems encountered in the production of the aggregates were outlined. Manufactured sand was compared to natural sand insofar as its use in concrete is concerned, and the research on sand manufacturing methods done in the laboratories of the Industrial Minerals Division in Ottawa, which supplied basic data for design of the Seaway sand plants, was described.

In a paper entitled *Industrial Minerals Research in the Laboratories of the Industrial Minerals Division,* Ottawa, M. F. Goudge, chief of that division, outlined the various kinds of research projects being undertaken, described the main facilities of the laboratories, and indicated the service they can render to the producers and users of industrial minerals. The staff of this division includes mining engineers, ceramic engineers, geological engineers, chemical engineers, metallurgical engineers, engineering physicists, chemists, mineralogists, and other scientists skilled in mineral technology, who bring their special skills to bear on the work in hand. Assisting the senior staff is a junior staff of skilled technicians who operate and maintain the laboratory equipment.

The division is divided into five sections, each supervised by a section head responsible to the chief of division. These sections are: ceramics, industrial waters, construction materials, nonmetallic minerals, and milling. The principal research projects being undertaken in each section were outlined. These include work on kyanite, lithium minerals, barium titanate, corrosion by industrial waters, a study of clays, investigations into failure of concrete, the manufacture of sand, production of magnesia from various raw materials, and research on asbestos.

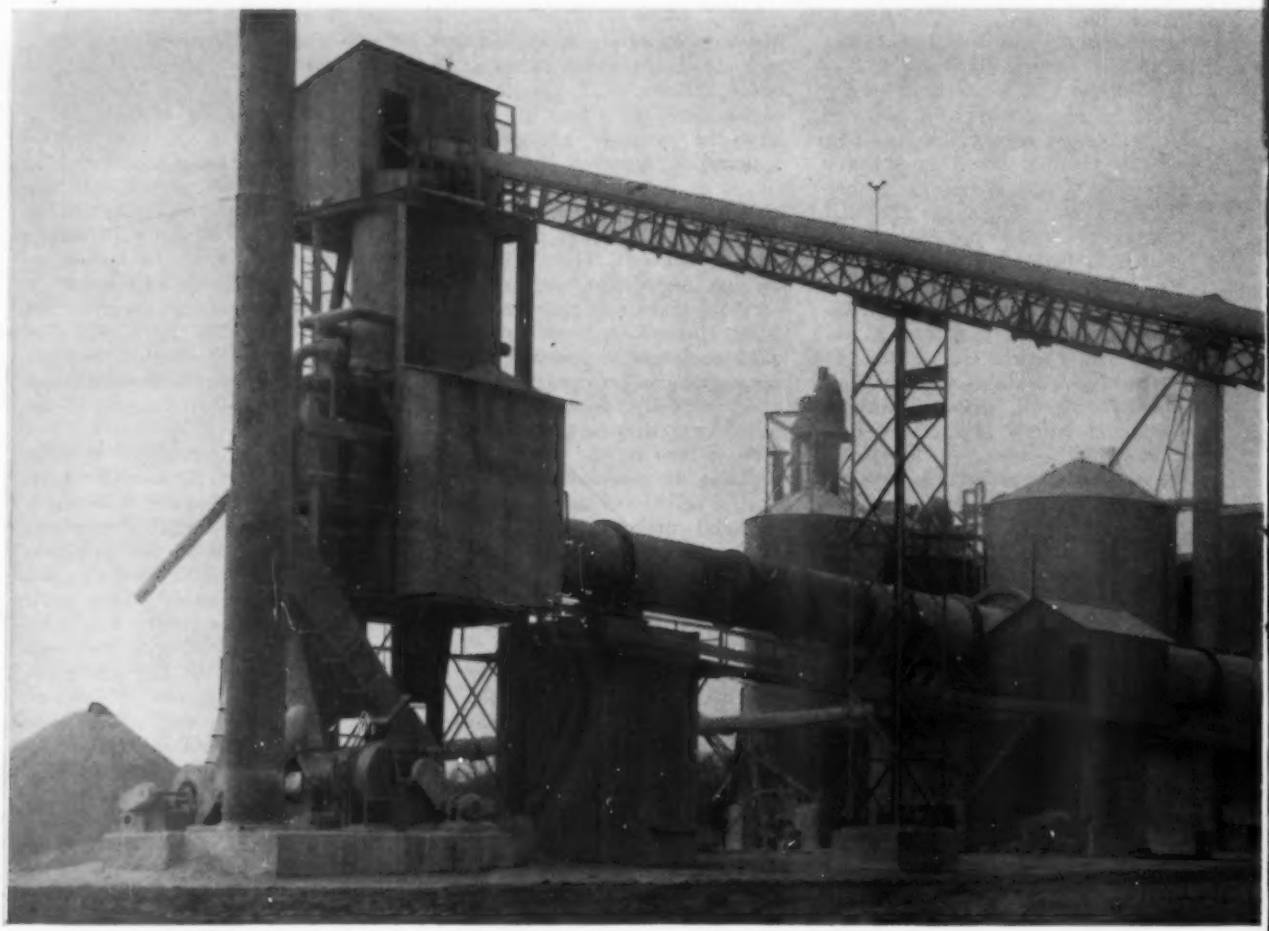
Lithium—Its Past, Present, and Future a study prepared by W. M. Raynor of Foote Mineral Company presented a brief survey of the situation concerning lithium minerals, the processes used in extracting usable lithium compounds from them, and the known reserves of lithium ores. The latter were estimated at 60,000,000 tons, equivalent to 811,000 tons of lithia, or to 1,310,000 tons of lithium carbonate, based on a recovery of 65 percent. On this basis, assuming a consumption of 25,000 tons of lithium carbonate equivalent per year, the known reserves will suffice for 52.4 years.

Mr. Raynor is optimistic on the future for lithium and stated that its remarkable properties and increased availability will make it one of the best growth elements of the future.

Electrostatic Separation of Feldspar and Other Nonmetallic Minerals, a paper presented by Grant S. Diamond, Spar-Mica Corporation, set forth the theories and principles of a new electrostatic beneficiation process to produce pottery-grade feldspar from pegmatite. The flowsheet of the Golding-Keene Company at Keene, N. H., was given, together with analyses of products and costs of mining, milling, and processing. The cost per ton of rock handled was $4.42, and the cost of pottery spar produced was $9.73 per ton. The author was of the opinion that the process would be applicable to other nonmetallic minerals such as spodumene, fluorspar, kyanite, and talc.

At the business meeting of the Industrial Minerals Division the following slate of officers was elected: chairman, Russell Wyman; vice-chairman, William Bray; secretary, John E. Reeves.

• In the quarry of the Marks-Wicker Company, Inc., an 18-ton Model 65 International Payhauler truck is negotiating a 10 percent grade on the haul to the plant, near South Hill, Va. The Payhauler, loaded by a 1-cu. yd. Lorain shovel, moves the shot stone to a 30- by 42-in. Pioneer crusher. This unit produces 1,000 t.p.h. of stone per 8-hour shift.



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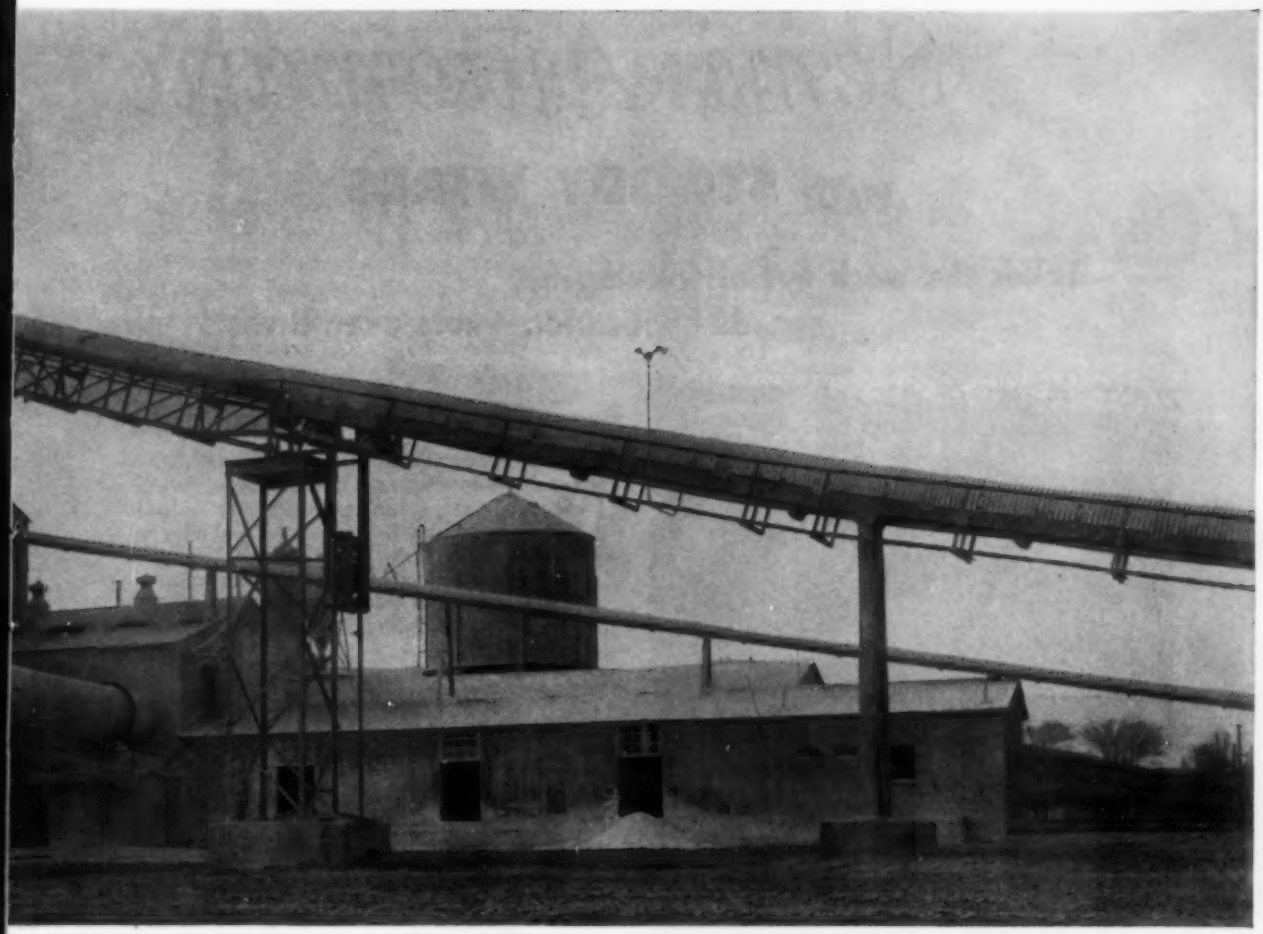
At the Linwood quarry, J. F. McDonnell, Plant Superintendent, and Gunder Torstenson, Gulf Jobber, watch some of Linwood's heavy equipment at work. All equipment—in the plant and at the quarry—operates smoothly with Gulf quality fuels and lubricants.



Linwood Stone Products Company keeps equipment rolling smoothly with Gulf Quality Fuels and Lubricants

Trucks, shovels, crushers, conveyors, kilns—they all depend on Gulf products at Linwood Stone Products Company. There's a good, sound reason: Gulf fuels and lubricants help the cost-conscious men at Linwood to keep equipment operating smoothly, with fewer overhauls . . . fewer mechanical delays . . . lower maintenance costs.

For instance, Linwood reports that Gulf lubricants last up to three times as long as the lubricants they previously used.

Like to cut your operating costs, and get maximum performance from your equipment—both in your plant, and outside? Do as Linwood Stone Products Company did: call in a Gulf Sales Engineer. He will be glad to analyze your specific problems, and make proper recommendations. Just contact your nearest Gulf office!

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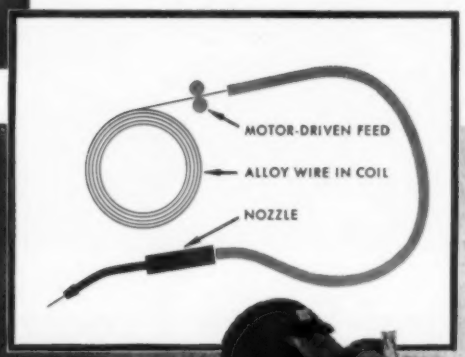
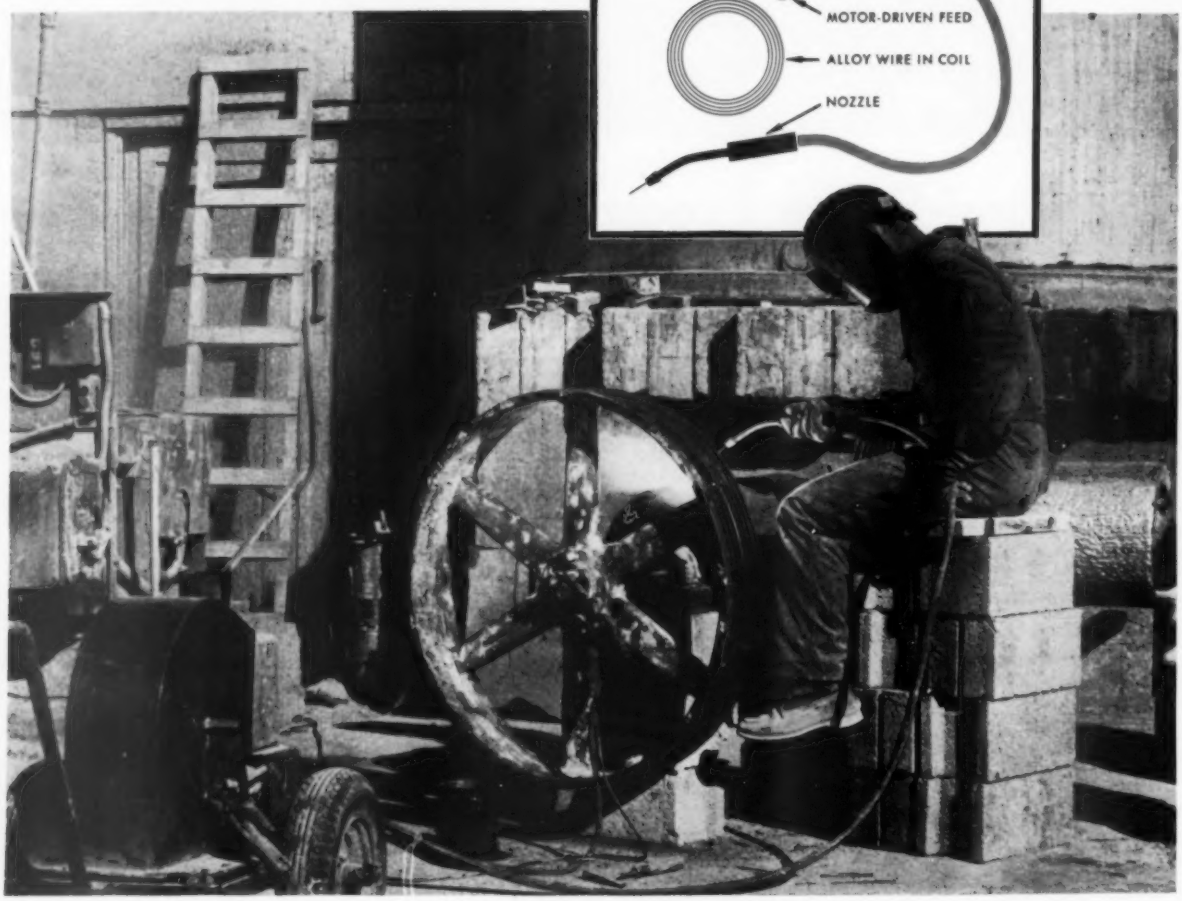
Stoody Wires are supplied in layer-wound coils for use on any automatic welding machine, with minor conversions. The wire is mechanically fed to the nozzle by a motor-driven feed roll and idler roll which are actuated when the arc is struck. The welder thereafter merely directs location of the weld deposit, the machine feeding the wire automatically as the arc is struck, stopping when the arc is broken.





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Semi-automatic hard-facing with Stoody Tubular Alloy Wires is one of the greatest labor-saving processes yet developed for the maintenance man! It hustles you through jobs at speeds 2 to 4 times faster than manual welding. Wires are bare, need no flux or flux dams. Deposits are thus fully visible during welding... easy to lay along an edge or to a mark.

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Remember, with Stoody you get a complete range of proven, time-tested wires, from low alloy to high alloy types, plus a tungsten carbide... all backed by 10 years use in the field!

Nickel Manganese and Stoody 121 Wires are available in 3/32" or 7/64" O.D. Other alloys in 7/64" diameter only. All Stoody Wires feed through most semi-automatic machines with only minor changes in wire guides, feed rolls and nozzle.

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Stoody 108

Applications... Sprockets, shovel idlers and pads

Stoody 121

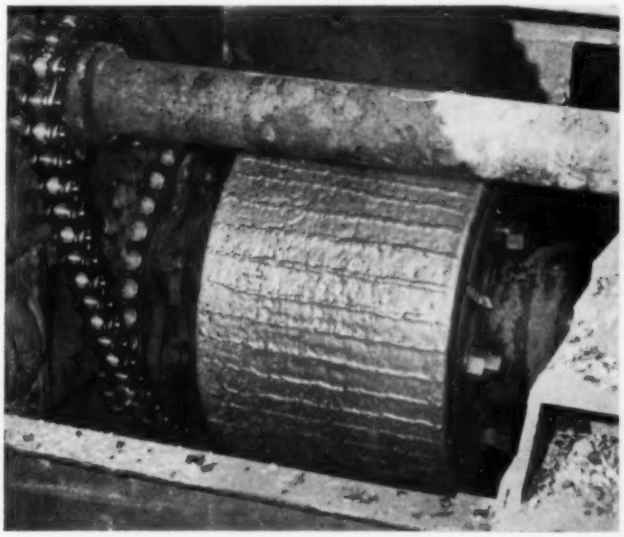
Applications... Crusher rolls, impellers in impact type crushers, bucket teeth and lips, scarifiers and rippers, cement mill pulverizer rings, loader lips

Stoody 130

Applications... Earth boring and scraping operations on equipment such as tool joints, augers, conveyor flights, scraper blades, rippers and concrete mixer paddles

Stoody Nickel Manganese

Applications... Strength welding and rebuilding of manganese parts



new company, process, plant developed to produce

TRULITE . . .

unique lightweight aggregate

WITH production initiated on June 3, 1955, just two years ago, a new type of lightweight aggregate was introduced into the construction materials market by an equally new company, the Trulite Corporation, of Ceredo, W. Va. Sold under the trade name of Trulite, this new material weighs just 1,250 lb. per cu. yd., and 8-in. equivalent concrete masonry units incorporating this aggregate, while weighing only 26 lb., test over 1,000 p.s.i.

By BUREN C. HEROD

Manufacture of Trulite is carried out in a plant which, as the first of its type, converts the refuse from a coal preparation plant into a lightweight aggregate through a process on which the company has filed patent application. Located on the Ohio River, west of Huntington, the original plant, although incorporating full-scale equipment, was actually a pilot operation, on which construction was started in December, 1954. It was established to provide data on production of the aggregate which previous research had shown could be made from the coal refuse.

Successful operations with the original facility, as well as growing demand for the product, led the firm to undertake expansion of the plant —a step which included the addition of a second traveling grate stoker. As a consequence of this expansion, which is virtually completed, the 3-t.p.h. capacity of the original plant that was placed in operation during the summer of 1955 has been raised to 12 t.p.h., or nearly 80,000 tons per year.

The roots of the new company and its new process are found in a problem—one that relates to the disposal of refuse from the Ceredo preparation plant of the Truax-Traer Coal Company. This refuse consists of ½-in. by 0 rejects from the preparation plant's wash boxes and coal launders. The rejects have been pumped from the plant to a large settling basin at a rate exceeding 200,000 tons annually. While the plant prepares coals containing relatively low refuse, it handles a high tonnage and is located in an area where space for additional rejects is limited.

In view of the volume of coal being processed, it was evident some time ago that refuse disposal would become a major problem. Preliminary investigations by C. N. Howard, president of the Trulite Corp., who was at that time the plant and research engineer for Truax-Traer at Ceredo, led to a joint research project of the coal company and the U. S. Bureau of Mines at the latter's combustion research station in Pittsburgh.

An overall view of the Trulite plant, showing the feed belt and reclaiming tunnel, palletizing drum, left, and stockpile conveyor, right background.

An idea of the coal plant refuse disposal problem can be had from this view of a part of the area. The material contains about 45 percent combustibles, of which approximately 50 percent is carbon.

As a result of this research, it was found that the Ceredo refuse—consisting of about 45 percent combustibles and 55 percent clay, shale, and slate—could be very successfully sintered on an updraft traveling grate stoker. Due to its high carbon content (about 50 percent of the combustibles) the refuse is free-burning, as opposed to the more usual clays and shales which, in conventional sintering processes, must have coal added.

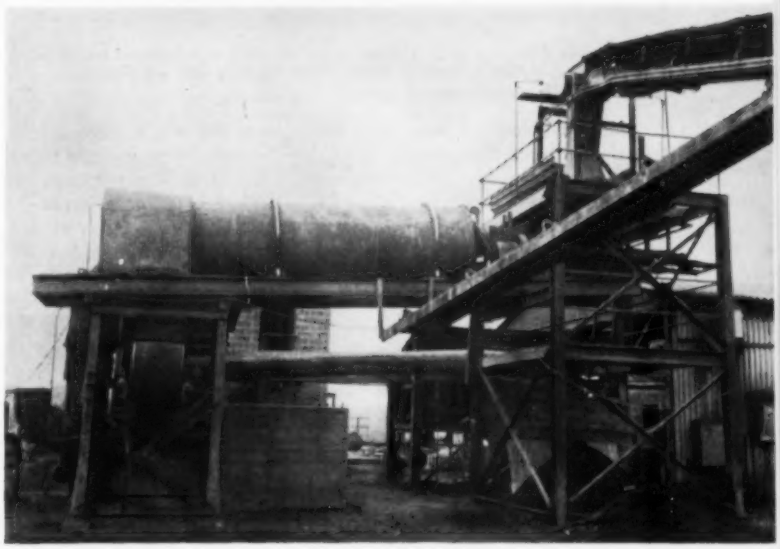
Since the coal company preferred not to undertake the production of lightweight aggregate itself, the Trulite firm was organized by Mr. Howard late in 1954. The new company was granted a 40-year lease by Truax-Traer for a plant site in an area that is underlain by nearly 50 ft. of material pumped from the preparation facility over the last several years. Approximately 2,000,000 tons of the minus ½-in. refuse is available to the sintering operation.

As mentioned above, the joint research project had shown—on laboratory equipment—that the material could be sintered on a traveling grate. Therefore, the original plant was erected as a full-scale pilot operation and placed in production in June, 1955. While the facility as then constructed affirmed the feasibility of producing high-grade lightweight aggregates from the refuse, several problems presented by full-scale operations were encountered.

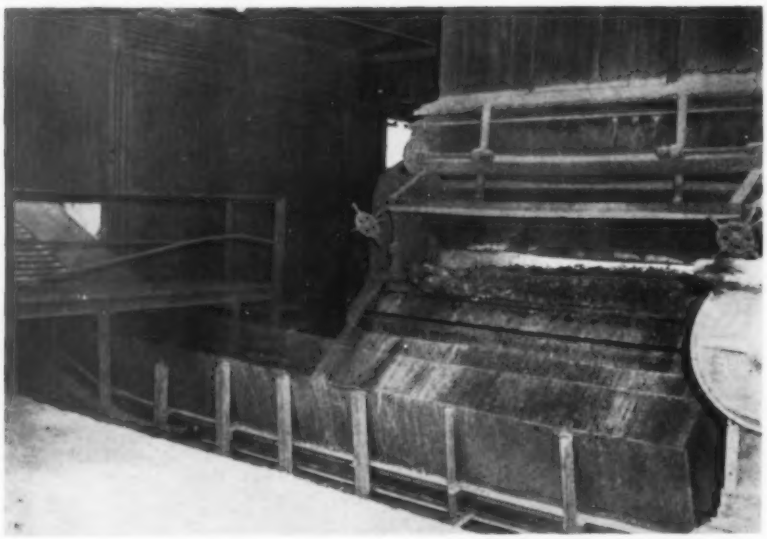
Among these were difficulties in the pelletizing phase, excessive abrasion caused by water-quenched clinker on the chains of an apron conveyor that removed the clinker from the stoker, failure of heat-resistant belting to meet operating conditions, refractory failure due to insufficient stack area, and other difficulties.

However, each problem was met successfully, and the improved original plant enlarged with the addition of a second stoker. With the large part of the design of the operation developed by Mr. Howard, C. A. Grace, Trulite vice-president, and the Templeton-Mathews Corporation of Terre Haute, Ind., assistance was also rendered by Combustion

Right: Seen here on the plant feed pile, the scraper is automatically shifted on its bridle system by a sequence timer.



If the feed is not sufficiently moist to pelletize readily, it is sprayed with water in this pelletizing drum.



The discharge end of one of the two updraft traveling grate furnaces. Thickness of the clinker clinker bed seen here is controlled by a ratchet-operated gate over the grate.

Both furnaces discharge to a common apron conveyor that is shown transporting clinker to a foundry shakeout. The latter is currently being replaced with a jaw crusher.

Engineering Corporation, who designed and built the new grate. Incorporating as nearly fully automatic operation as possible, controls for the excavator, conveyors, screens, pelletizer, crushers, dryer, stokers, and related stoker equipment are provided on a central panel.

Among the items installed in the expansion of the facility, and in replacement of original equipment, are a Link-Belt Roto-Louvre dryer which replaces the original unit built by the local crew, a new bucket elevator, a surge bin, Jeffrey Traylor feeders, and a Lloyd type Combustion Engineering traveling grate stoker.

As noted previously, the plant itself sits on a part of the approximately 50-ft. layer of washery refuse, and is so situated that material can be drawn to it from almost any direction. Recovery of the raw material is accomplished with a 1½-cu. yd. Sauerman Crescent drag scraper that is provided with automatic control in which a sequence timer governs the shifting of the scraper bridle system across a 300-ft. span between two bridle towers.

The system is operated by a 40-hp., three-drum (inhaul, backhaul, and shifting), single-speed hoist, and is equipped with ¾-in. Union Wire cable. Material reclaimed from the settling basin, involving a progressive shifting of the scraper along the line between the bridle towers, is dragged to a drying area, from which it is subsequently drawn to a plant feed or surge pile.

Below the pile are a feed hopper and a reclaiming tunnel, fabricated of 10- and 6-ft. Armco tunnel liners, respectively. A 26-in. rotary-table feeder, equipped with a variable-speed drive that is controlled from the central panel, transfers the raw refuse from the hopper to the 14-in. by 100-ft. feed belt. The latter transports the material to a company-designed 4½- by 14-ft. pelletizing drum. Operated at 10 r.p.m., the drum is provided with nozzles through which water is sprayed onto the material if it is not sufficiently moist to pelletize readily.

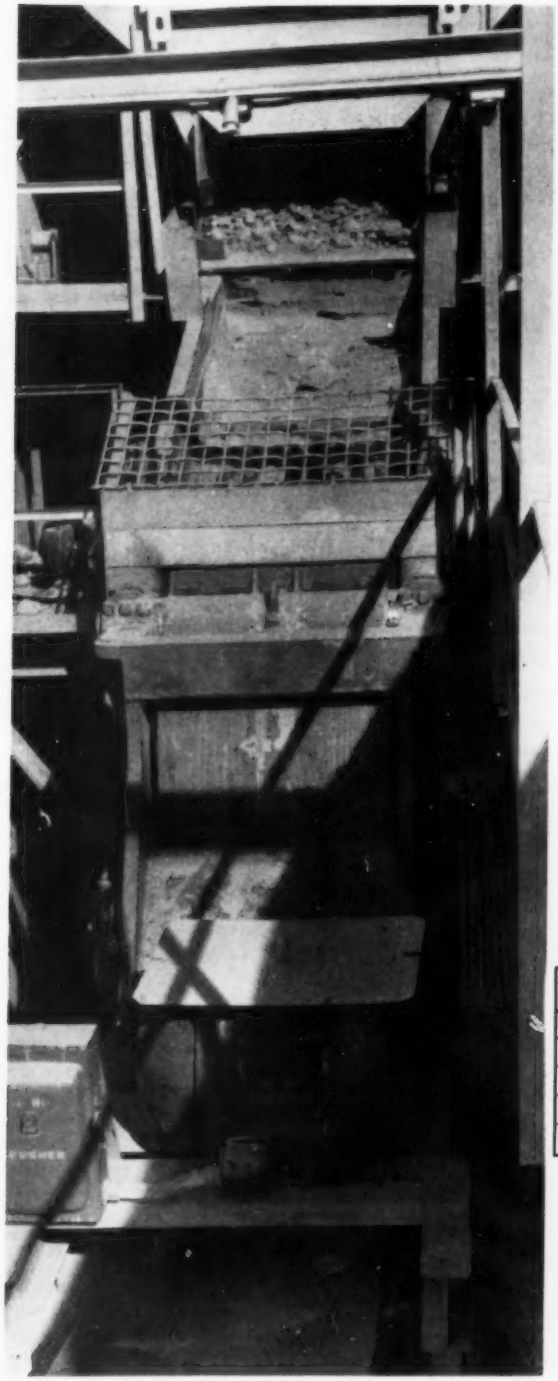
Pellets are transported on a 14-in. belt feeder from the drum to the dryer. The latter is equipped with a 25-hp., No. 737, 23,000-c.f.m. Sturtevant fan that provides induced draft at a 4-in. static pressure and a 10-hp., 10,000-c.f.m. American Blower Co. exhaust fan. Heated air for drying, at 900 degrees F., is drawn by the induced draft fan through dustwork connected to the hoods of the furnaces. Dried pellets are discharged to the boot of a company-built bucket elevator, which in turn discharges to a 20-ton surge bin.

A pair of Jeffrey Traylor feeders below the surge bin supply pellets to the distributing conveyors of the original and new stokers at the rate of about 6 and 18 t.p.h., respectively. Mounted on casters, the distributing conveyors are pivoted through a small arc by rotating double-thread bars, thus distributing the material evenly across the width of the two stoker grates.

While the chain grate in the original stoker is 10 ft. wide and 35 ft. long—providing an effective grate surface of 10 by 30 ft.—it actually consists of two 10- by 17½-ft. Coxe type units combined. The new stoker is a 26- by 35-ft. unit, with more than triple the capacity of the former.

Both furnaces are equipped with plastic refractory arches designed, and materials supplied by, the A. P. Green Fire Brick Company as monolithic linings of Super Green Hybond. The original furnace is equipped with a 30-hp., 20,000-c.f.m. forced-draft fan, and the new stoker with a 75-hp., 65,000-c.f.m. unit. These provide updraft combustion air at 4½- and 6-in. static pressures, respectively, through separately controlled wind boxes below the traveling grates.

(*Continued on page* 212)



36" x 20" Kue-Ken crushing 100 tph at 3" setting

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Save 62% on power . . . operate on standard, inexpensive motors

Kue-Ken is designed to *use* its power not to waste it. Unlike conventional crushers that waste 50% to 70% of their power even idling and require oversize starting motors, Kue-Ken uses 95% of its power profitably in crushing rock. The average power used to crush 1 ton of rock for all sizes of Kue-Ken Crushers is .54 hp. The average power used to crush 1 ton of rock for all sizes of conventional crushers representative of all American makes is 1.4 hp. Figures were taken from 12 manufacturers' catalogs representative of 31 crushers in 8 sizes.

Perfect lubrication, low bearing pressures and elimination of rubbing between jaw plates are the exclusive features that make Kue-Ken crushing so efficient and economical. This Kue-Ken efficiency pays off also in greater capacity. Look for your requirements in the chart below. See how a Kue-Ken can provide that capacity in a smaller model than any other crusher can. Profit from the lowest cost per ton crushing . . . install Kue-Ken Crushers.

Kue-Ken crusher size	¾"	1"	1¼"	1½"	2"	2½"	3"	3½"	4"	5"	6"	Horsepower range
24" x 12"	22	26	32	36	43	50	56					15 to 30
30" x 12"	32	35	38	42	55	70	76	85	110			20 to 30
36" x 10"	38	47	57	67	80	91	105					25 to 40
36" x 20"					70	82	90	115	135	160		30 to 50
42" x 25"					90	120	150	165	180	215	250	40 to 60

Table of tons per hour that will pass through crusher with jaws set at dimension shown when measured in the closed position.

Table is based on crushing average hard, dry quartz or similar rock weighing at least 100 lbs. per cubic foot when crushed.

Write for catalog

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DENVER, COLO. . . . . Union Supply Co.
CASPER, WYOMING . . . . Moss Equipment & Supply Co.
VANCOUVER, B. C. . . . . Universal Equipment Co.

Pennsylvania Crusher Division, Exclusive Licensed Eastern Manufacturer and Distributor, 323 S. Matlack St., West Chester, Penn.
Armstrong Whitworth (Metal Industries) Ltd., Authorized Licensed Manufacturer and Distributor. Close Works, Gateshead-upon-Tyne 8, England

Wolf G. Bauer

Planetary Layout

a modern concept in minerals-processing plant design

By **WOLF G. BAUER**
Consulting Engineer

ANOTHER P&Q EXCLUSIVE

THERE are, of course, many schools of thought on how a general minerals processing plant should be laid out when rotary dryers or kilns are involved in one of the processing stages. Two requirements seem to have taken precedent over others in layout design:

1. The handiest and most obvious location of equipment with respect to process, topography, and plant site conformity.
2. Centralization of instruments and control somewhere within a standard T, L, U, or straight-line material flow orientation pattern, or within each department as a distinct process phase.

There are no objections to these well-taken points of the plant designer. Certainly, all points under the first consideration are entirely justified, and this writer, too, places the satisfaction of processing requirements at the top of his list. However, within the concept of "planetary" layout, *centralized plant control and supervision is not attempted by leading manual and automatic control means into a central control room* located at varying distances from the several processing stages or plant departments, *but is actually achieved by locating the processing stages within immediate sight and reach around the operator* as planets around their sun. In planetary design the equipment or process stages are arranged with process requirements fully satisfied, but *with the operator definitely in mind.*

SOME SHORTCOMINGS OF PLANT LAYOUTS

Whenever in the past an operation required the use of rotary dryers, kiln, and coolers, it became standard procedure to locate the feed preparation and rotary equipment feeding department or stage at one end, and the subsequent processing departments at the other end of such a rotary equipment system. Often the distances along the material flow path between raw material plant entry and finished product plant exits are long ones, whether tortuous or straight-line. In the case of medium-size or small plants these distances may still be of such relative lengths as to require either extended and thus infrequent walking between process stages on the part of the operator, or the employment of several attendants isolated in each location. Small plants can ill afford such multiple supervisory personnel costs.

It is also rather obvious that there are many process phases, feeding operations, material transfer points, etc., in a plant which do not lend themselves to constant remote instrument or manual supervision and regulation without unreasonable expenditures and upkeep costs, whether they are remote controllers or warning and correcting systems. We all have learned that some operators will often find shortcuts and easy ways of doing things, to the detriment of maximum production and efficient supervision. Obviously an operator will be more lax and less inclined to inspect, check, and consistently supervise a critical process or material flow point at an awkward or distant location than he will one that is readily accessible.

Process Stage Interdependence If, for instance, moisture, particle size distribution, or some other material factor changed in the feed preparation department upstream from the kiln-burning operator, such variations often upset subsequent drying or calcining. Frequently this is due to *a lack of immediate recognition and response* because of the great distance that a rotary kiln imposes between preparation or feeding regulation station and the burning control room. The distance either makes

(*Continued on page* 210)

for road screening operations it's . . .

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For accurate screening . . . maximum resistance to abrasion, vibration, and fatigue . . . long screen life and the assurance of large tonnage output at low cost . . . you can depend upon CF&I Industrial Screens. That's because CF&I Screens are made from specially selected steel, then crimped and woven extra tightly to assure maximum usage throughout screen life—even when subjected to severe corrosion, abrasion, or high temperatures.

Next time you need industrial screens, take a tip from the builders of the Nation's highways and choose CF&I Industrial Screens. You'll find it a profitable choice.

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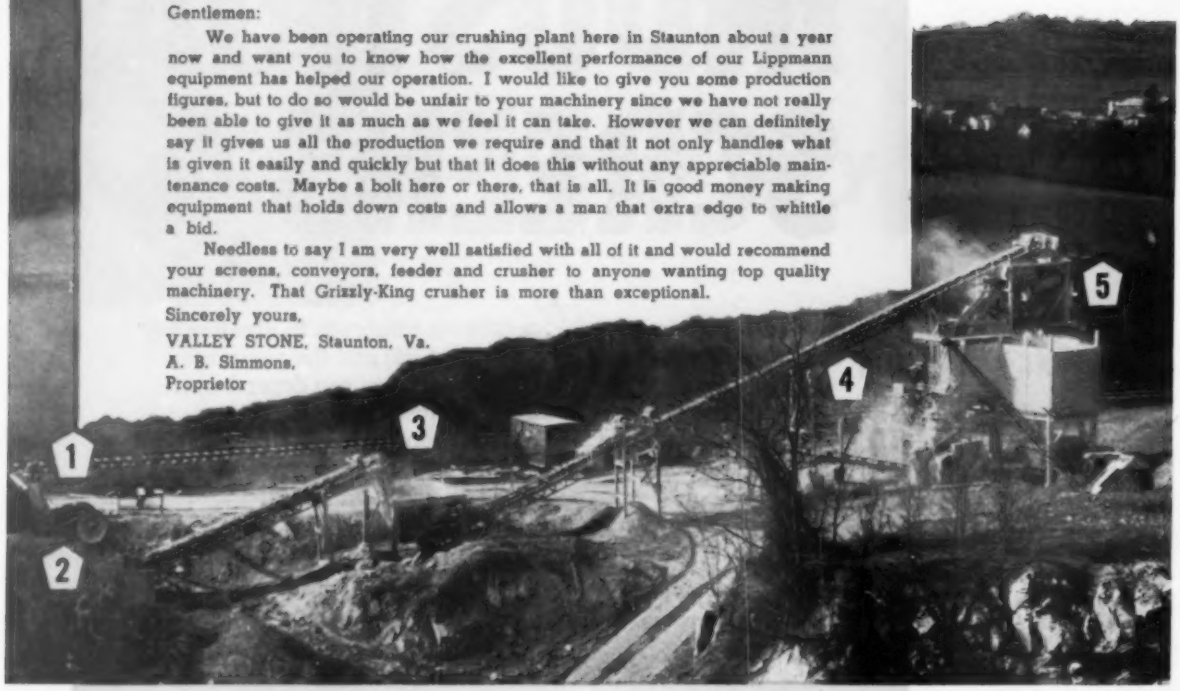
"Allows a man that extra edge to whittle a bid" says A. B. Simmons

Gentlemen:

We have been operating our crushing plant here in Staunton about a year now and want you to know how the excellent performance of our Lippmann equipment has helped our operation. I would like to give you some production figures, but to do so would be unfair to your machinery since we have not really been able to give it as much as we feel it can take. However we can definitely say it gives us all the production we require and that it not only handles what is given it easily and quickly but that it does this without any appreciable maintenance costs. Maybe a bolt here or there, that is all. It is good money making equipment that holds down costs and allows a man that extra edge to whittle a bid.

Needless to say I am very well satisfied with all of it and would recommend your screens, conveyors, feeder and crusher to anyone wanting top quality machinery. That Grizzly-King crusher is more than exceptional.

Sincerely yours,
VALLEY STONE, Staunton, Va.
A. B. Simmons,
Proprietor



Lippmann Stationary Crushing Plants

It is when conditions become competitive that material producers appreciate their Lippmann Equipment most. That is when 34 years of Lippmann engineering experience, applied to the overall layout and make-up of their plants, really counts. That is when the special design and know-how built into Grizzly-King and Rock Ram Jaw Crushers, Ever-Seal Conveyors and Screen-All Vibrating Screens, proves its extra value — enables operators to keep ahead competitively — to keep delivering specification material on schedule and at a profit.

Add to this Lippmann's practice of pricing its equipment in competition with ordinary machines, plus backing its products to the limit, and it's no wonder the switch is to Lippmann.

If you want to know more about the reasons behind this swing — whether it involves crushers, feeders, screens or complete stationary and portable washing or crushing plants — then contact your local Lippmann Dealer, or Lippmann Engineering Works, Inc., direct at 4607 West Mitchell Street, Milwaukee 14, Wisconsin. Learn how Lippmann quality can go to work for you too.

1900-57-3

1. Heavy Duty 3x10 Apron Feeder
2. Grizzly-King 24x36 Jaw Crusher
3. Lattice Frame Belt Conveyor — 24"x45'
4. Lattice Frame Belt Conveyor — 24"x135'
5. Triple Deck "Screen-All" 4'x12' Vibrating Screen

WRITE FOR NEW LITERATURE on famous Lippmann Portable Plants: "Mohawk" Primary (#1610); "Comanche" Dual (#1600).

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SINCE 1923
CRUSHERS FEEDERS SCREENS CONVEYORS CRUSHING & WASHING PLANTS

More Information, Please

Use the prepaid postcard to get this literature or additional details about new equipment and products reported elsewhere in this issue.

"ATLAS EXPLOSIVES PRODUCTS," a 48-page, illustrated catalog published by the *Atlas Powder Company*, contains facts and figures to help users of explosives, descriptions of the firm's complete line of explosives products, and provides specific assistance in the selection of explosives for various industries. **(1)**

WATER SUCTION AND STEAM HOSE are described in literature published by the *B. F. Goodrich Industrial Products Company*. Operating data and specifications on 5 types of water suction hose and 5 types of steam hose are included. Complete coupling information is provided. **(2)**

"PUMPS FOR DIAMOND DRILLING," a bulletin published by the *E. J. Longyear Company*, deals with transmission and single speed pumping units used in diamond drilling. Drilling practices and advantages of transmission pumps for most core drilling operations are described. **(3)**

REX CEMENT MILL BUCKET ELEVATORS are described in Bulletin 3304 released by the *Chain Belt Company*. Tables to simplify the selection of elevators are included, in addition to dimension tables, chain specifications, and illustrations. **(4)**

DAY EQUIPMENT FOR STORING AND HANDLING BULK MATERIALS is featured in a bulletin prepared by *The Day Company*. Descriptions, specifications, and dimensions of Day vertical and horizontal tanks are included, along with photos of typical installations. **(5)**

BULLETIN MH-57, issued by the *Sesco Engineering & Supply Corp.*, describes Sesco belt conveyors and bucket elevators for handling all types of bulk materials. Specifications, horsepower requirements, and installation photos are included. **(6)**

WHITMORE'S LUBRICANTS for plant, pit, and quarry are discussed in a folder released by *The Whitmore Mfg. Co.* Types of Whitmore lubricant suited for use on specific types of equipment are recommended. **(7)**

"FORD TRACTORS AND THEIR INDUSTRIAL APPLICATIONS" is the title of an illustrated booklet showing *Ford Motor Company's* tractors and industrial equipment in action. The booklet contains abbreviated specifications of all equipment. **(8)**

CHICAGO BRUNNER & LAY ROK-BIT, INC., has published a folder on carbide "600" Rok-Bits in following gauge sizes—4, 3½, 3, 2¾, and 2½ in. in "X" type body; and 3½, 3 and 2¾ in. in cross types—for use on 600 series extension drill rods, without an adaptor. **(9)**

MODEL SV CONCENCO CONSTRICTION PLATE CLASSIFIER, described in a bulletin offered by *The Deister Concentrator Co.*, is used in sand plant operations for the removal of —100 Mesh material and for splitting fine sand into a variety of sized products meeting rigid specifications. **(10)**

"GAR WOOD-BUCKEYE CONSTRUCTION NEWS," a new construction magazine to be published quarterly by *Gar Wood Industries, Inc.*, will feature on-the-job stories, explanations of unusual equipment applications, and a regular service feature. Subscriptions are free. **(11)**

RECIPROCATING-PLATE FEEDERS made by *McLanahan & Stone Corp.*, are discussed in Technical Bulletin No. FRE-57. Performance data and dimensions for the heavy-duty and light-duty feeders are featured. **(12)**

A V-8 MODEL POWER UNIT has been introduced by the *Construction Equipment Div., International Harvester Co.* The unit has a 66-hp. rating at 2,600 r.p.m. using gasoline and LPG; a 155-hp. rating at 2,600 r.p.m. using natural gas. **(13)**

THE COMPLETE LINE OF POWER TRANSMISSION EQUIPMENT made by *Clark Equipment Co.* is described in a new booklet. Illustrations, cutaway photographs, torque rating, speeds, weight, and synchronization are included. **(14)**

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JULY, 1957

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Use the prepaid postcard to get this literature or additional details about new equipment and products reported elsewhere in this issue.

TWENTY NEW PLATFORM DUMP BODIES comprise the 1957 line available from the *Daybrook Hydraulic Div., L. A. Young Spring & Wire Corp.* Dimensions, specifications, and hoist recommendations are available on descriptive sheets. **(15)**

A DIGEST OF SPECIFICATIONS OF INSTRUMENTS and controls manufactured by *The Hays Corporation* is offered in a new condensed catalog. Sections cover instruments for pressure, flow, temperature, level, gas analysis, and receivers and controllers. **(16)**

A NEW CATALOG of conveyor and elevator belts issued by the *Manhattan Rubber Division, Raybestos-Manhattan, Inc.*, covers new style designations of general service heavy-duty types of conveyor belts made with special strength members. **(17)**

THE NEW A SERIES AUTOMATIC DRAGLINE BUCKET is described in Catalog A57, released by the *Page Engineering Company.* Sections illustrating the features and applications for each of the three bucket classes are included. **(18)**

INDUSTRIAL POWER UNITS are outlined in a 19-page catalog issued by the *Detroit Diesel Engine Division, General Motors Corporation.* Specifications are given on 31 engine models ranging from 44 to 761 brake horsepower. **(19)**

GRATINGS AND TREADS manufactured by the *Blaw-Knox Company* are pictured in Bulletin No. 2527, which contains descriptions of electroforged, riveted, rectangular, diagonal, "U" type, and "T" interlocked grating and treads. **(20)**

MODEL 105-AC, a 5/10 cu. yd. crawler-mounted crane-shovel, is described in Bulletin 756, published by the *"Quick-Way" Truck Shovel Company.* Specifications, shovel and trench hoe ranges, and crane capacity are given. **(21)**

THE 1957 DIRECTORY of coal mines and coke ovens located on or accessible to *The Baltimore & Ohio Railroad* and lateral lines has been published by the B&O. Listings are both alphabetical and geographical. **(22)**

LUBRIVAL, a Dualine circulating oil system, is described in Bulletin No. 70, available from the *Farval Corporation.* The bulletin contains a schematic arrangement of system components. **(23)**

CONVEYORS AND BINS manufactured by *L. B. Smith, Inc.*, are featured in Bulletin No. 101-C. In addition to illustrations of the individual products, the booklet contains photographs of actual plants designed and fabricated by the firm. **(24)**

HELIWELD EQUIPMENT, designed by the *Air Reduction Sales Company* for use in applications of Air Reduction's tungsten arc Heliweld process, is described and illustrated in Catalog 2300. **(25)**

AUTOCAR MODEL AP40, a 40-ton off-the-highway rear dumper manufactured by *Autocar Division, The White Motor Company,* is featured in a specification sheet which provides performance data, dimensions, and weight. **(26)**

HEAVY MEDIA SEPARATION PLANTS for rock beneficiation are presented in a bulletin issued by *Southwestern Engineering Company.* Basic application data and a chart on density relations for magnetic suspension media are included. **(27)**

EHRSAM ELECTRIC ELEVATORS and belt manlifts, discussed in a catalog available from *The J. B. Ehrsam & Sons Manufacturing Company,* conform to the requirements of the American Standard Safety Codes and all local and state codes. **(28)**

THE INTEGRAL-AXLE "5TH WHEEL" tandem trailer suspension is detailed in a booklet just released by the *A. O. Smith Corporation.* Detailed drawings of the new unit are included. **(29)**

JULY, 1957

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PLAIN PRIMACORD

Textile-covered, flexible and resilient. Suitable for surface trunk lines and shallow holes where tensile strength and resistance to abrasion and cutting are not required. Tensile strength 125 lbs. 1000-ft. spool 17 lbs.

REINFORCED PRIMACORD

Textile reinforced, tough, resilient, flexible. Recommended for surface trunk lines and deep holes where normal strength and resistance to abrasion and cutting are needed. Tensile strength 160 lbs. 1000-ft. spool 18 lbs.

PLASTIC WIRE COUNTERED PRIMACORD

Armored with wire and covered with plastic material. Recommended for use in deep, ragged holes or with metal or fibre explosives containers, where strength and resistance to abrasion and cutting are essential. Tensile strength 300 lbs. 1000-ft. spool 33 lbs.

BLASTERS AGREE that thunderstorms, high tension lines, power cables — even two-way radios — can be sources of stray electrical currents . . . and that these can cause premature shots under certain conditions.

The best safeguard against such hazards is to use a detonating agent which is insensitive to stray electrical currents.

In primary blasting, use Primacord as the detonating agent in each hole and also as the trunk lines to connect all holes so that they will fire in proper rotation. The entire blast can be detonated from one point on the trunk line — with fuse and cap or electric blasting cap. This final hook-up is made only when all is in readiness and when it is *safe* to fire.

In secondary blasting, use Detacord to prime each charge and to connect all charges, detonating it in the same way.

If your holes are primed with fuse and cap, connect the fuses with Quarrycord.

For more information, see your explosives supplier or write to

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Covered with tough plastic material, not affected by high Summer heat or Winter cold. Waterproof—resistant to acids commonly encountered. Use for extremely deep holes, river crossings, field shots that must stand for long periods of time and in other wet conditions. Tensile strength 275 lbs. 1000-ft. spool 22 lbs.

DETACORD

Smaller (and less powerful) than Primacord. Core of PETN is textile-reinforced and wax finished. Identified by light brown surface with cross windings of red yarn forming an "X" pattern. Resilient, flexible. An economical detonating fuse for use in secondary blasting, long hole underground blasting and pipe-line ditching. *Not* recommended for primary blasting. Tensile strength 100 lbs. 500-ft spool weighs 8 lbs.; 1000-ft spool weighs 16 lbs.

QUARRYCORD

Used to connect and ignite safety fuse in secondary blasting. Burns progressively with an external flame at the zone of burning — about one foot per second. Flexible — not affected by stray currents. 500 ft. spools. Quarrycord Connectors — 100 in a box.

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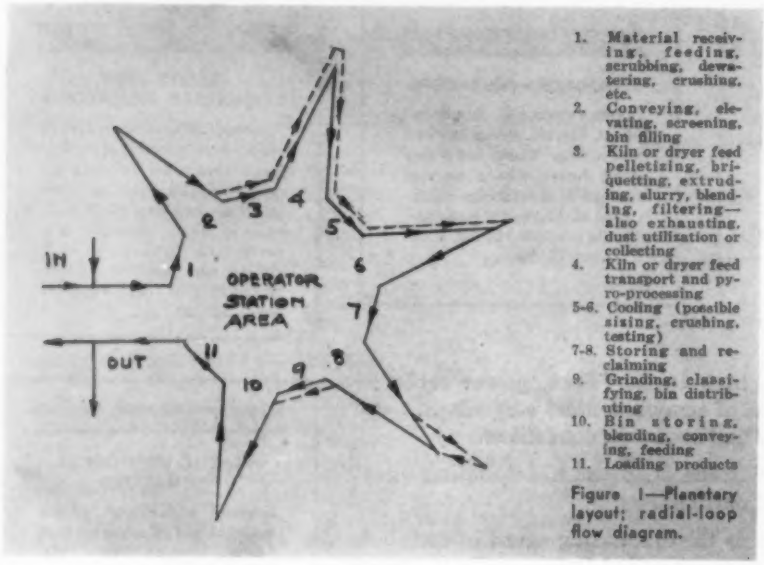
P-4



1. Material receiving, feeding, scrubbing, dewatering, crushing, etc.
2. Conveying, elevating, screening, bin filling
3. Kiln or dryer feed pelletizing, briquetting, extruding, slurry, blending, filtering—also exhausting, dust utilization or collecting
4. Kiln or dryer feed transport and pyro-processing
5-6. Cooling (possible sizing, crushing, testing)
7-8. Storing and reclaiming
9. Grinding, classifying, bin distributing
10. Bin storing, blending, conveying, feeding
11. Loading products

Figure 1—Planetary layout; radial-loop flow diagram.

Planetary Layout

(*From page* 204)

for isolation and lack of frequent communication between two operators, or results in time and effort expended away from the job of burning supervision.

Similar examples apply to other subsequent process stages in the plant where lack of immediate recognition of upstream process or mechanical equipment variations adversely affect the downstream conditions. Such conditions are so universal in many small plants, and also in some larger operations that they are considered necessary evils dictated by standard plant layout. But it need not be so. We need only a new approach in layout. This has been well proven by the writer by results obtained in a new plant designed recently, in which the radial loops were mostly vertical, but where one operator handled all of four process departments from the control area.

HOW IS PLANETARY PLANT DESIGN ACHIEVED?

Obviously, if our operator Mahomet cannot go, or only infrequently goes to the distant critical points of equipment and material action, then these points ought to be brought to him. This is not the monumental task of moving the mountain as may be supposed at first glance. Furthermore, only a little reflection on the economics and other advantages will show rather good justifications for any small increase in cost entailed by such a radial-loop arrangement.

The term "planetary" design was coined to designate a grouping of process stages or departments about a central operator control and activity area. Actually, the design is based on a layout of loops of material-processing flow having their origin and terminus along the perimeter of the operating station area. This radial-loop flow of each process stage may be an unbroken continuous flow of material, such as through a dryer or a grinding system, or it may be interrupted by an intermediate surge bin or storage pile with a reclaiming system, where the interruption does not constitute a process phase as such.

The process loops may extend horizontally away from and return to the central station perimeter, or they may lead off vertically and return, or form a combination of both. In all cases, however, the important point to keep in mind is that the operator or operator team working from a central supervision area do not generally have to leave this area in order to see, inspect, test, maintain, adjust, and control material and equipment of each process stage. (See Figure 1.)

Planetary Design With Rotary Equipment The relatively great lengths of processing equipment such as rotary dryers, kilns, coolers, scrubbers, tube mills, etc., have physically separated the feeding and discharging stations to a more or less marked degree.

The usual kiln feeding area, for example, may include truck dumping, primary crushing, secondary reduction, screening, bin filling and feeding therefrom, extrusion, pelletizing, briquetting, filterpressing, predrying, fan exhausting of gases, draft control equipment, and preheaters, as well as dust collection and dust re-use feeding and processing. Feed rate to the kiln may be dictated not only by process conditions in the kiln hot zone, but also by the varying nature of the material at the feeder. All this can much more readily be supervised, operated, evaluated, and controlled right alongside the firing control area by the simple expedient of providing a conveyor to transport the prepared and controlled feed to the kiln feed-entry end. This might be the only concession the planetary layout would entail in the way of extra equipment. Even so, this can be more than justified for that department alone. The cooled material from the cooler discharge may or may not be led back to the operator station, as it can go directly to storage prior to returning on another process loop.

ADVANTAGES OBTAINED WITH PLANETARY DESIGN

In any process it would constitute a very distinct achievement and advantage if the discharging and the feed preparation and feeding of a rotary kiln system for example, were taking place side by side under one man's control. This would allow immediate constant and ready inspection, early corrective regulation, and intelligent comparison of the stream of material before and after processing through one stage. Repeating this apparent advantage several more times for any further process stages in the minerals processing operation, it would not be too difficult to visualize the whole plant as though it were laid out on a giant circular curved mirror about the operator, much as a schematic flow diagram control board.

Furthermore, a greater potential of operator utilization, will be realized, as this plant concept could well (and does) eliminate at least one attendant. If more than one operator is required in a planetary layout because of a large number of process stages rimming the operator station area, their ready availability to each other at any particular instant provides re-enforced action when needed.

Compactness and economy of plant site space is an added feature of this design layout; and it is a simple matter to provide room in the radial pattern for future additions of process equipment.

In the modern approach to any plant design, the eventuality for en-

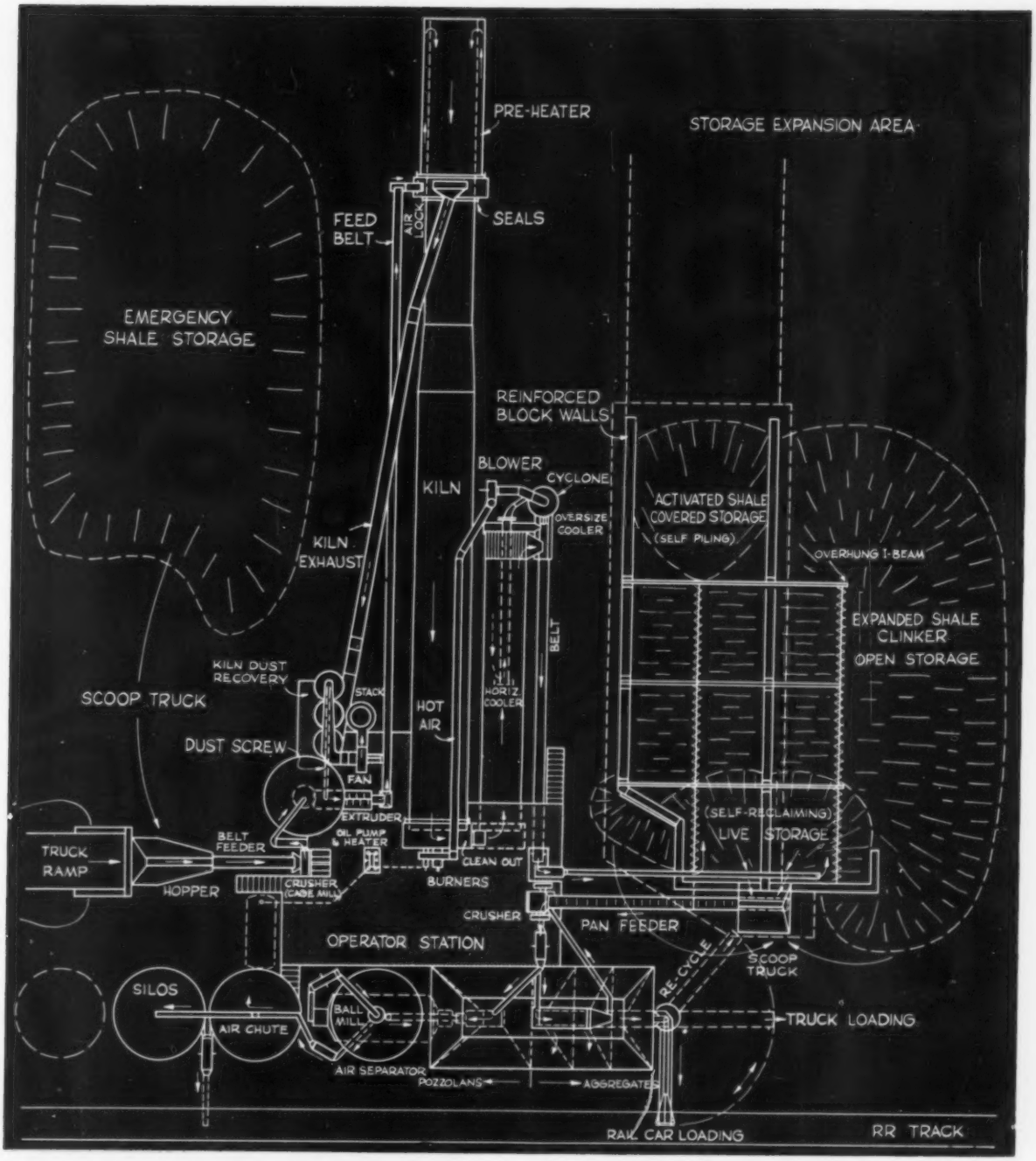


Figure 2—A plan view of a planetary layout, adapted in this case for a dual-purpose expanded-aggregate and pozzolan operation.

larging the operation at some future date is usually taken care of with extra reserved space by the designer. It is also common practice to build a new plant with initial extra capacity of conveyors, bins, feeders, pipelines, etc., at each end of any process stage that may be enlarged later. If this is not done, the future plant expansion would, to all intents and purposes, amount to a full second or third plant alongside the original.

If the radial loop system of planetary layout is used, it is necessary only to provide for future loops between or around the original equipment line and then tying the similar-process loop ends together at the interstage conveyors.

THE OPERATOR STATION AREA

In the more usual spread-out plant pattern there is, of course, an economic justification limit in how many controllers and instruments one can install for centralized plant control. The smaller operations are particularly penalized in the appli-

(*Continued on page* 213)

Trulite

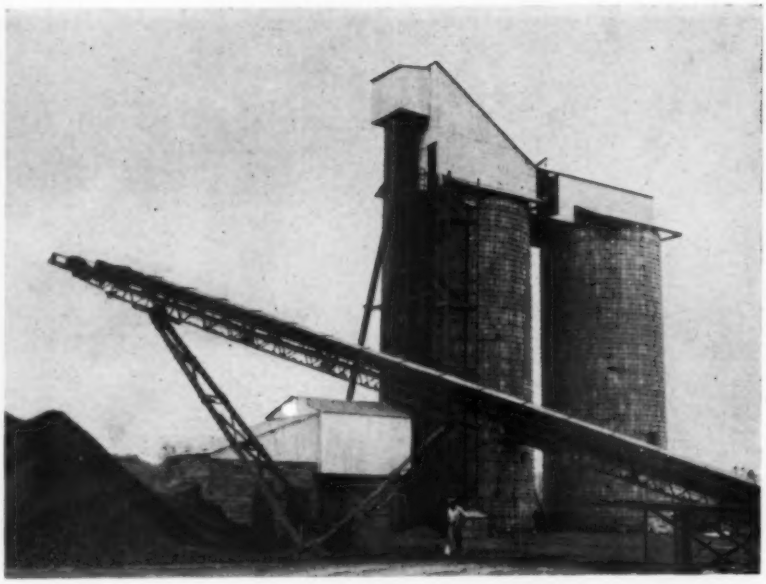
(*From page* 202)

Once the sintering operation has been initiated, progressive burning is maintained by the radiant heat of the grate surfaces and combustion air. The 40 to 60 percent range of combustibles in the material results in self-sintering at temperatures from 2,500 to 2,600 deg. F. For maximum burning efficiency, temperatures are recorded on a strip chart from various points in the operation, including the arches, locations along the grates, stack, etc. In accordance with temperature recordings, the combustion air is carefully controlled through manual operation of dampers at each windbox.

Thickness of the clinker formed as the material sinters is controlled by a ratchet-operated gate over the grate. Following a grate travel of about 38 ft. per hour on either unit, the clinker breaks by gravity from the overhang and drops on to a company-built apron conveyor serving both furnaces.

While the clinker had formerly been dropped from the grate into a water pit for quenching, the resultant material had proved to be highly abrasive to the conveyor chains, and that method was abandoned. The clinker is now received on the apron conveyor without any quenching.

Discharged by the apron conveyor on a foundry shakeout (which will be replaced with a 20- by 45-in. jaw crusher), the hot clinker is subjected to the first reduction. Through the shakeout action, the clinker receives a rough reduction, but no sizing. The shakeout discharges directly to an 18-in. by 85-ft. inclined conveyor that supplies the stockpile of 3-in. by 0 furnace-run material.

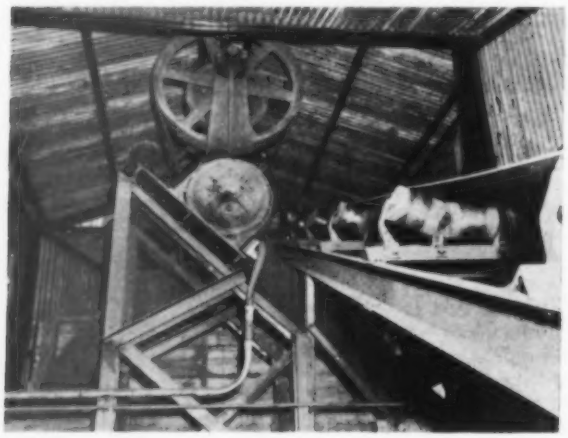


From the stockpile of furnace-run material, left, the clinker is reclaimed via tunnel conveyor and fed to a rim grinder housed in the smaller structure. Screens are mounted over the storage silos of finished product.

A Jeffrey feeder in a reclaiming tunnel below the stockpile transfers the clinker to a conveyor on which it is transported to a Riddell rim grinder. Driven by a 40-hp. motor, the grinder reduces the clinker to ⅜ in. by 0. The ground material is then raised in a Link-Belt bucket elevator and discharged to a pair of screens mounted above one of two 400-ton capacity Neff & Fry concrete stave storage silos.

Both of the 4- by 8-ft. Allis-Chalmers Aero-Vibe screens are single-deck units, and are fitted with abrasion-resistant ⅜-in. square opening stainless steel Tyler screencloth. Oversize material from both screens is returned *via* gravity chute to the rim grinder. Minus ⅜-in. aggregate passing both screens can be chuted to the underlying silo, or, by means of a short conveyor, can be supplied from one of the screens to the adjoining silo, in a separate and simultaneous feed to allow for two sizes, if required by the trade.

While contract haulage is used to supply a local concrete masonry producer, the plant is so advantageously situated that future shipments may also be made by barge or railroad. The nearby dock facilities of the Truax-Traer plant may be used for loading barges on the Ohio River, and rail shipments may be originated on three railroads—the B.&O., the



The clinker is reduced to ⅜ in. by 0 in this rim grinder prior to screening

This 40-hp. three-drum hoist, using ¾-in. cable, drives the scraper system.

C.&O., and the N.&W.

A total of about 350 hp. is required by the various phases of the operation. Principal motors and controls installed are Westinghouse equipment. Motors exceeding 2 hp. are equipped with combination starters, while fused-switch starters are used on motors of 2 hp. rating and less.

The finished lightweight aggregate produced in this unusual plant meets A.S.T.M. specification C130-42. Concrete masonry incorporating Trulite is described as being characterized by a lighter color as well as lighter weight than cinder blocks. It is also noted that Trulite blocks are free from any combustible, iron, or other substances which might cause stains or popouts.

Planetary Layout

(*From page* 211)

cation of numerous automatic regulators in view of the high cost per ton of material controlled. Since an operator is needed in any case to watch instruments, to reset control points manually, and to supervise equipment and material flow performance, it would be a distinct simplification and a safety factor if he had the opportunity also to watch and inspect the material and machinery he is controlling. This opportunity is provided at the central station area.

Here with a little thought, ingenuity, and perhaps a slight concession in conveyor lengths, feeder height, and bin elevation to obtain convenient headroom, etc., material is made to spill, carry, slide, feed, and process at visual level at the rim of station area. There may be several strategically located mezzanines and balconies leading out from the perimeter, and if vertical inspection is frequently required along a process loop, a low-cost manually operated one-man hoist can be readily placed on the operator floor.

Inspection doors are built on a hinged and slanted-seat design instead of bolting, for rapid look-see and entry to elevators, bins, and process equipment. Oversize material or recirculating streams from screens or classifiers are deposited on conveyors in such a way that the operator can see the flow ratios at all times. At process equipment transfer points the material is exposed conveniently to show its changes before and after treatment. Suction is provided wherever dust and fines with machinery-generated pressure would prevent easy inspection or for access testing.

Instruments, automatic controllers, dampers, valves, switches, samplers, etc., are grouped in front of each process stage or department, although these can also be located in the center of the area where they would face the process loop they control.

Physically, the station is larger than normal for control rooms. It is roofed, and may or may not be elevated above ground level. Within its confines it may include the supervisory and maintenance tool house and supply cage, washroom, foreman's cubicle, and any other needs directly connected with processing and plant production. A study of a plan view of such a layout (see Figure 2, p. 211) will disclose the relatively large roomy area from which the operation is managed. It is also typical of the compactness that can be achieved, even with a dual-purpose expanded aggregate and pozzolan operation, as shown.

Expanded Aggregate Boom Predicted for Ohio

An engineering research team at Ohio State University has predicted a new multimillion-dollar industry for Ohio within the next few years —the production of expanded aggregate.

Source of the aggregate is clay or shale. An Ohio survey, begun in 1955 and just reported by the Engineering Experiment Station at the university, indicates that there are promising deposits of these source materials in all areas of the state. Many of the deposits are located near market areas, and the materials are easily recoverable.

Ohio plants now producing lightweight aggregate from shales are located in Cleveland, Marietta, and New Lexington. Promising deposits have also been found in several other counties, including Delaware, Wayne, and Franklin.

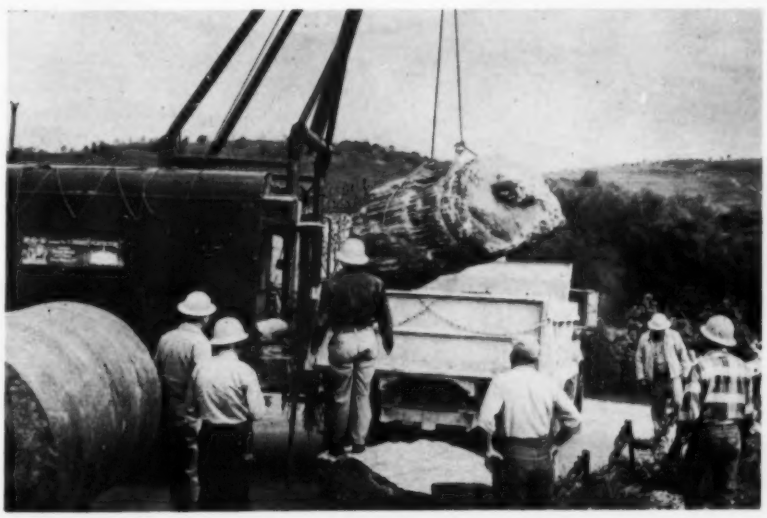
Mexican Cement Industry Growing at Steady Rate

Final figures on Mexico's cement industry in 1956 show a total production of 2,300,000 tons, valued at approximately $36,000,000, according to *Nacional Financiera*. This figure is eight times the volume produced in 1936, and reflects an average annual increase of 11 percent.

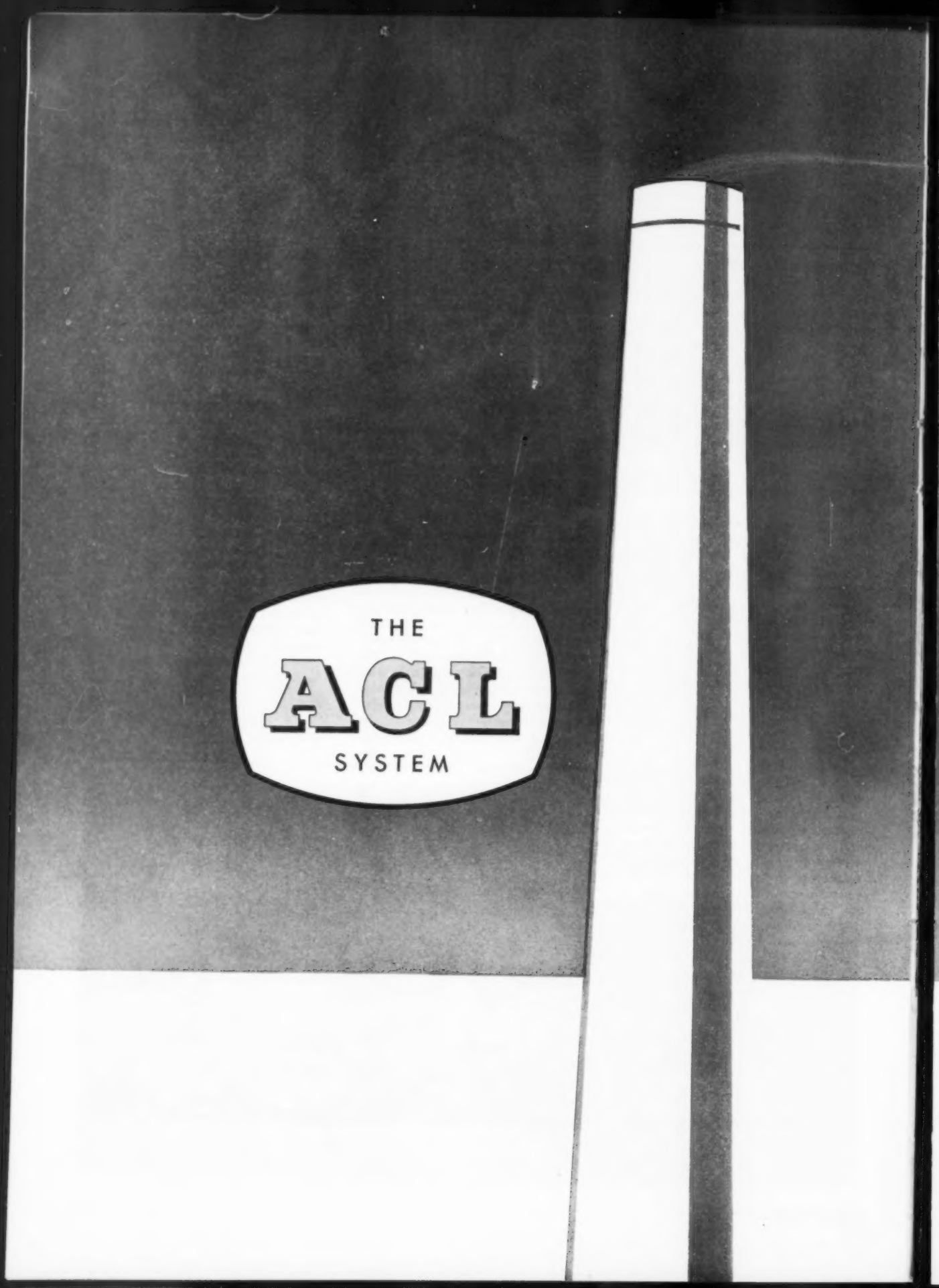
In 1946 Mexican cement production averaged 94.79 lb. per capita. It rose in 1950 to 121.25 lb., and to 165.34 lb. per capita in 1956. Total investments in the industry are estimated at more than $120,000,000.

Nacional Financiera reports that many cement manufacturers are contemplating expansion, and new plants are being established in regions previously served from main industrial zones.

J. E. MARTIN has been elected president of the Ohio Sand and Gravel Association, succeeding D. S. Foland.



• This 4-ton stalagmite, largest undamaged crystal ever unearthed by a blast in the Calaveras Cement Company quarry at San Andreas, Calif., has been placed on display at Angels Camp Museum in Calaveras County. Company employees are shown unloading the huge stalagmite which is 7 ft. in length and 7 to 10 ft. in circumference.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Labor Developments

Wages and Prices

By S. HERBERT UNTERBERGER

S. Herbert Unterberger and Company
Economists-Consultants on Labor and Industrial Relations

Washington, D. C.-Philadelphia, Pa.

A recent report made by the U. S. Bureau of Labor Statistics has stirred up a wide controversy over whether it proves the contention of many economists, particularly those with a pro-business viewpoint, that a large portion of the inflationary price increases in recent years has resulted from rapid wage hikes.

The Bureau of Labor Statistics report showed that average hourly earnings, including fringe benefits, rose 61 percent from 1947 to 1956. It also reported that output per man-hour rose only 26 percent, and that in these years prices of non-farm goods and services rose by 28 percent.

The fact that average hourly earnings rose far more rapidly than productivity—that is, output per man-hour—was promptly interpreted by many readers, including correspondents for some prominent newspapers, to imply clearly that the wage increases forced the price increases.

This conclusion was promptly challenged by the Bureau of Labor Statistics, which pointed out that such a conclusion should not necessarily be drawn from their findings. The Bureau pointed out, very properly, that conclusions about the relationship between prices and wages could certainly not be drawn from average hourly earnings data alone. It was argued that the critical figure for this purpose is the figure for labor costs per unit of output. While average hourly earnings increased 61 percent from 1947 to 1956, Bureau spokesmen pointed out that unit labor costs rose only 28 percent. This conclusion led them to a coincidence which proved most interesting, namely, that the rise in unit labor costs and the rise in prices for this period were both exactly 28 percent. This fact required some "explaining away."

Actually, no adequate explanation has been given. The Bureau has tended to argue that these increases in unit labor costs have not been the cause of equivalent price increases because in their studies they learned that price increases generally occur first; and then wage increases seem to follow.

Business analysts, on the other hand, while agreeing generally that this may be the usual sequence, have stressed that businesses have been raising their prices in anticipation of the fact that they would have to give a wage increase. This situation has become a "chicken and egg" debate. Far more will have to be known about the relationship between wages and prices before anyone can say what causes what. However, the report at least serves the purpose of working out all of the statistical facts for the first time. It has also put a number of labor spokesmen on the defensive.

It may be anticipated, therefore, that there will be a large propaganda barrage from organized labor to undo any harm its bargaining objectives may have received from the disclosure of these facts and the coincidences seen in them.

UAW Bargaining Program

Among the most important of these bargaining objectives are those of the United Automobile Workers of America, primarily because this very large and powerful union has so often led the way into new areas of collective bargaining.

Furthermore, this union has not, in recent years, made any secret about its forthcoming bargaining demands. It will be remembered that some years before the UAW won a form of the guaranteed annual wage, it put the employers on notice that they were going to demand this very important new benefit, and they even provided the basis on which the demand would be made.

This tactic is being repeated for 1958. The union, after a recent convention, announced that its major objective in 1958 is to be a shorter work week, with increased take-home pay. In its usual fashion, it is supporting this demand with a very sophisticated economic analysis, a part of which has already been published. Much more is sure to come.

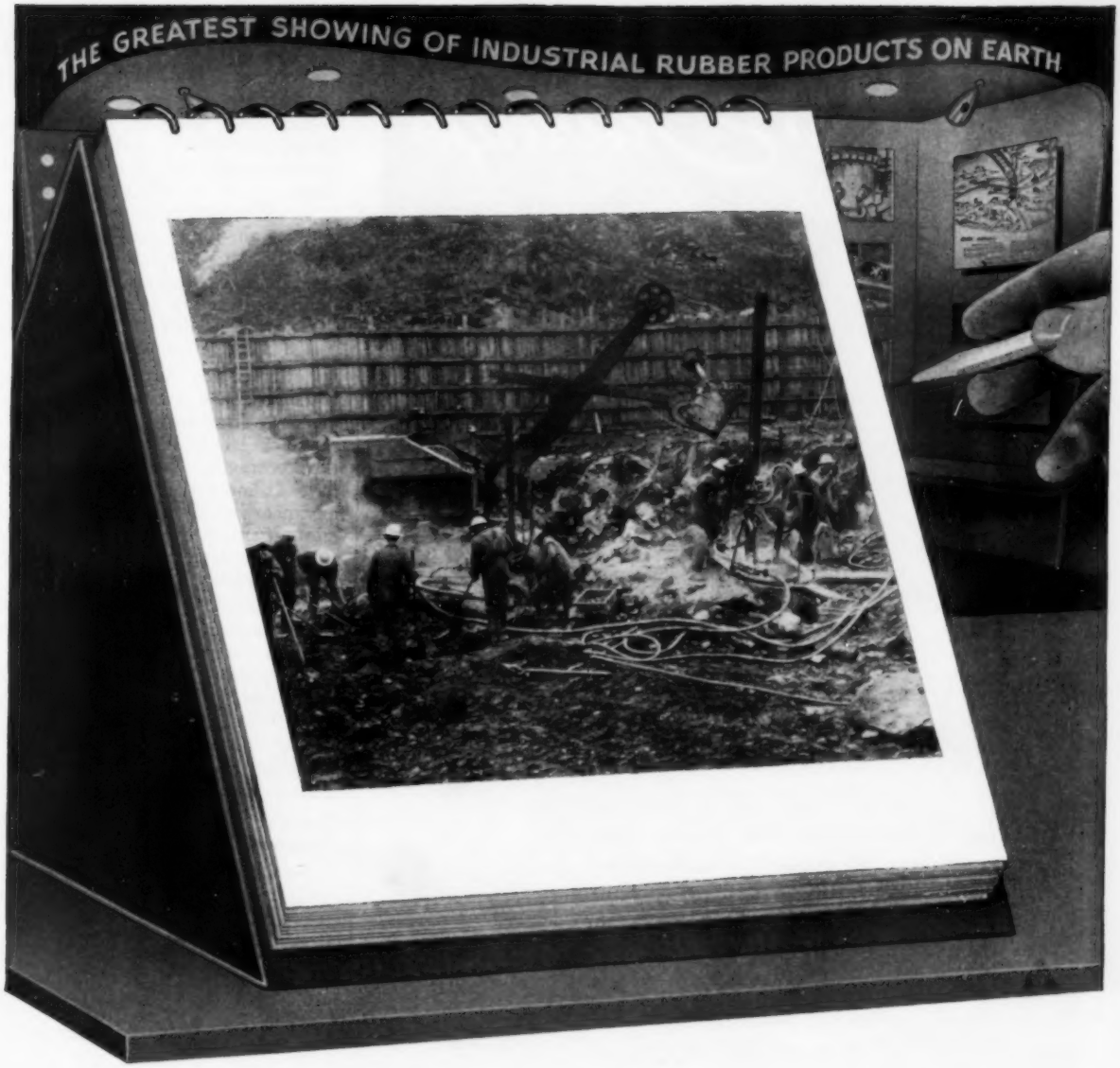
It should be no surprise to many American employers that ideas which are set forth originally by the United Automobile Workers come to rest on their own bargaining tables a year or two after they are first so presented. Therefore, the following excerpts from the UAW resolution supporting this objective of the shorter work week should make interesting and important reading to those employers.

". . . The Second Industrial Revolution through which we are now living opens the way to new progress in increasing leisure. Automation and other technological innovations are rapidly reducing the time and effort required to produce an increasing quantity of goods and services. Meanwhile, the economic machinery for the distribution of our growing output lags far behind our advancing productive efficiency. The result is that non-working time will inevitably increase.

"Our only real alternatives may well be to absorb that time in voluntary, creative, and constructive leisure based on a rational reduction in the hours of work or to suffer the involuntary and barren idleness of widespread unemployment . . .

"We seek the shorter work week not solely for the negative purpose of minimizing unemployment, but at least equally important, for the positive purpose of winning more free time for a richer and fuller life for our members and their families.

"Our modern technology makes it practical and realistic and in fact imperative, to achieve gains simultaneously in both leisure and living standards. Automation, the harnessing of atomic energy for peaceful purposes, and other productive tools



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provided us by science and technology will bring us the twin gifts of material abundance and more time to enjoy it.

"Our goal, therefore, must be not merely the shorter work week with present weekly pay, but more take-home pay for fewer hours of work. It would be dangerously unrealistic to seek anything less. Only by increasing living standards at the same time as we reduce hours of work can we create the greater purchasing power needed to balance our greater productive power.

"The timing of reductions in working hours is not a matter for arbitrary decisions by either management or labor. It must flow from the economic and technological facts. In industries where technology advances rapidly, such as the industries organized by the UAW, reductions in working hours must and will come relatively quickly.

"We must determine how rapidly it is possible to reduce the work week in our industries. We must decide upon the form the reductions will take. We must develop solutions to the practical problems presented by changes in the length of the scheduled work week."

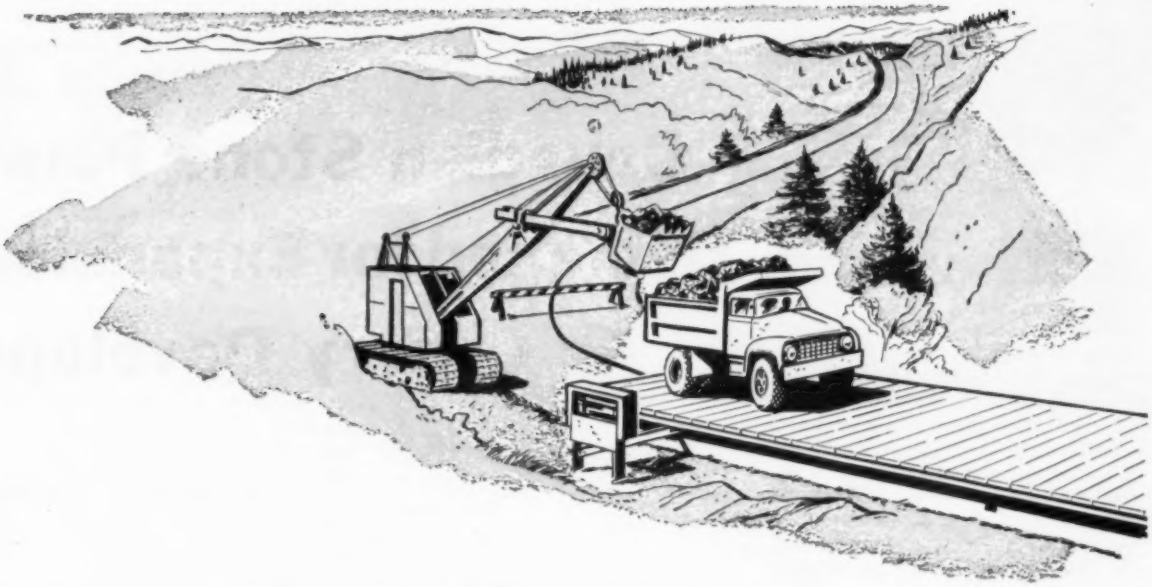
Sweden's Cement Consumption Reaches Record High in 1956

Sweden's cement consumption in 1956 reached a new peak of 2,210,000 tons, according to AB Skanska Cement, the country's leading cement producer.

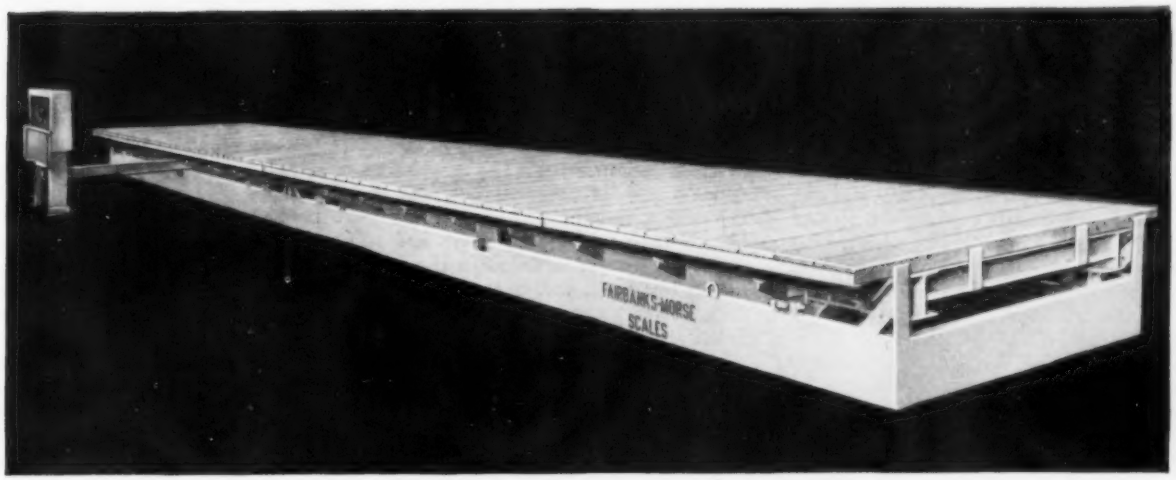
Despite increased consumption, however, cement production at Skanska's five plants at Limhamn, Hallekis, Kopring, Stora Vika, and Slite decreased from 2,010,000 tons in 1955 to 1,920,000 tons in 1956. A decrease in exports from 344,000 tons in 1955 to 289,000 tons in 1956 was a result of the Suez crisis.

The large-scale expansion of the productive capacity at the company's works was completed during the last year. Four of the five works were operating at practically full capacity in 1956, while at Slite only two kilns were in use during most of the year.

The third edition of a popular historical outline of the development of Ontario's mining industry is now ready for free distribution by the Ontario Department of Mines, Toronto, Can. The present edition has been revised to include developments up to the end of March of this year.



Weigh it at the job site



Here's a portable truck scale, completely self-contained, that can be transported by truck! Designed for use in road construction, at quarries, in gravel pits and on construction sites, the new Fairbanks-Morse Portable Vehicle Scale is a completely self-contained unit made to travel on a flat bed truck. No scale pit is needed!

Just take off the wooden platform panels, disconnect the transverse lever and tighten the hold-down bolts—and you have a package eight feet wide, legal to ride the highways.

Units can be used singly or connected in tandem to the same registering beam or dial. Standard models are available in eight lengths to 60 feet and in capacities of 30, 40 and 50 tons.

Analyze your present weighing practices. On-site weighing will probably save you time and money. Write today for the Fairbanks-Morse New Portable Vehicle Scale Bulletin No. ASM520.1. Fairbanks, Morse & Co., Dept. P Q - 7, 600 South Michigan Avenue, Chicago 5, Ill.

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ANOTHER ON THE SPOT REPORT

Canadian Stone Plant Designed for Expansion As Quarry Develops

By WALTER E. TRAUFFER

ONE of the biggest problems confronting aggregates producers is the growing scarcity of suitable and available deposits. Not only are the best deposits being rapidly depleted; they are in many cases also being made unavailable by the rapid expansion of cities and towns. This is just as true in Canada as it is in the United States. An example is the experience of Ray H. Savigny, who operates Ray H. Savigny Quarries Ltd., with a small crushed stone plant one mile south of Vineland, Ont. This business was founded in 1946 as Savigny Bros., with a quarry and a 170 t.p.h. crushed stone plant at Merritton, 11 miles west of Vineland. In 1951 Ray H. Savigny bought out his brother, Hugh H. Savigny, and the present company name was adopted.

It was not long, however, before the original deposit became exhausted, and none of the adjoining property was available. After a search throughout the area the present site was selected and a new and smaller plant was built there. Most of the equipment at the old plant was sold to a producer in the Montreal area. For the new plant used primary and secondary crushers were purchased. It went into operation in May, 1956, with a capacity of about 120 t.p.h. of road stone and concrete aggregates. The design, however, provides for the later installation of a 28- by 36-in. jaw crusher in the quarry and a conveyor to a surge pile there. A reclaiming conveyor will feed to the present primary crusher, which will then be the secondary unit. Provisions have been made for additional screens and other needed equipment. Capacity then would at least equal that of the old 170-t.p.h. plant.

The deposit is a hillside formation and is in the same stratum of rock as the old location. It is well inside all specifications, with a Los Angeles abrasion loss of 30.2 percent, and has a silica content of 1.34 percent. The formation is in thin layers and somewhat broken near the surface, but farther down the layers become thicker and more solid. The loose overburden, which varies from 0 to 2 ft. in depth, is removed at intervals with a scraper and bulldozer. The quarry was opened with an 18-ft. face. Later a second 18-ft. level was opened, and the two lifts will soon be operated as a single 36-ft. face.

Drilling is being done with a 3-in. Joy wagon drill, and holes are spaced 6 ft. apart in both directions. There are usually 120 to 130 holes in a shot, in five rows. Two types of explosives—60 percent Forcite and 70 percent Dynamex—are used, depending on conditions, and sometimes both are used in the same shot. Electric delay detonation is used. Yield averages about 3 tons to the pound of explosive, but due to the excellent breakage, no secondary shooting is required. A Caterpillar D8 bulldozer is used for cleanup in the quarry.

A Northwest 1-cu. yd. diesel shovel loads the stone into two 15-ton Euclid end-dump trucks. These now haul about 500 ft. and up an incline to the surface of the deposit to discharge into the Austin No. 8 (18- by 36-in.) primary gyratory crusher, which is driven through V-belts by a 75-hp. electric motor. An air hoist operates a stone hook, and a jackhammer with a breaker chisel or point is used to break up occasional slabs of rock which wedge in the crusher. Air for these units and the quarry drill is supplied by a 500-c.f.m. Holman compressor.

The minus 4-in. product of the primary crusher is carried on a 30-in. by 65-ft. belt conveyor to a Niagara 4- by 12-ft. 2-deck scalping screen. This has 2½- and ⅞-in. openings on its top and bottom

A conveyor takes stone from the primary crusher in the background to the scalping screen. Of the two secondary screens below, one has a hopper overflowing ⅞- to 2½-in. material to the truck-loading bin at the left.

decks, respectively. The oversize (2½- to 4-in.) is chuted to a 36-in. Allis-Chalmers gyratory crusher. The ⅞- to 2½-in. material off the bottom deck goes to a surge hopper over a Telsmith Gyrasphere crusher. Overflow from this hopper goes to a bin from which trucks are loaded for shipment. Ahead of this screen and elsewhere in the plant stone boxes are used instead of steel chutes to eliminate wear and noise.

The products of both crushers are carried on a 30-in. by 160-ft. belt conveyor to a 4- by 12-ft. Dillon 3-deck screen. This has 1¼-, ½-, and ¼-in. openings. The three products off these decks—1½-in., ¾-in., and ⅜-in. stone, respectively—and the screenings through the bottom deck, go to the four compartments of a 200-ton truck-loading bin. When the ¾-in. bin is full, it overflows to a pile from which it is bulldozed away. Later stockpiling conveyors will be installed for all four sizes. Loading out from stockpiles is done with a Caterpillar 1-cu. yd. loader and a Baker-Lull 2-cu. yd. loader. Shipments are weighed on a Gurney truck scale.

Another addition will be a washing plant near the primary crusher. This will be used to wash ⅜-in. stone, which will be trucked from the bin to the washer. The finished product, to be used for asphalt road surfacing, will be conveyed to a separate truck-loading bin. About 30 t.p.h. will be produced.

Ray H. Savigny is president and general manager of the company. J. D. Buchanan is secretary and treasurer. T. J. Davidson is superintendent, and Charles Thomson is weighmaster.

The 1-cu. yd. diesel shovel loading to one of the 15-ton end-dump trucks on the upper quarry level.

Right: The final sizing screen over the 200-ton, 4-compartment truck-loading bin.

Below: One of the two loaders used to fill trucks from stockpiles; this is a 2-cu. yd. machine on pneumatic tires.

The appointment of WILBUR M. TOMLINSON as sales manager of the Kansas City, Mo., territory of Universal Atlas was announced by George S. Need, vice-president, western sales region.

Mr. Tomlinson joined Universal Atlas in 1928 at Kansas City as a sales representative covering the eastern Oklahoma territory. In 1953 he was promoted to the position of assistant sales manager at Kansas City, a capacity in which he served until his present advancement.

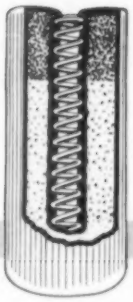
Larry Kelinson has been named manager of the advertising and sales promotion department of the Material Service Corporation. He has been assistant manager for the last year.

WINSLOW
Full-Flow
FILTERS

Case History Report No. 32 Shows Why Engines Protected by WINSLOW FILTERS Last Longer

A bank accident in the spring of 1955 dropped this D-7 bulldozer into 20 feet of water for 24 hours. After crankcase, radiator and other oil and grease containers were drained and flushed, and the tractor completely cleaned, it was put back to work and has operated *ever since* without overhaul, because it was protected by Winslow full-flow filtration.

Time Between Overhauls Doubled On Texas Firm's Diesel Engines



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Since 1952 all powered equipment of Gifford-Hill & Company, Inc., with fifteen plants producing aggregates and concrete in Texas and Louisiana, has been protected with Winslow Full-Flow Filters. This includes dozens of diesel locomotives, tractors, ready-mix trucks and draglines, with several makes of engines.

Before installing Winslow Filters, the time between overhauls on heavy duty diesels rangd from 3,000 to 6,000 hours, depending on the type of engine and service. Now the time between overhauls is 6,000 to 12,000 hours, a tremendous saving in down time as well as overhaul costs, plus substantially longer operating life for the engines. Corresponding improvements are made on other types of equipment.

Fuel Filters, Too

All equipment at Gifford-Hill is further protected by Winslow Fuel Filters, which remove moisture, acid, dirt and other impurities from fuel oil, to protect working parts and improve performance on all types of engines.

For complete data on the application of Winslow Filters, please write or call

WINSLOW ENGINEERING & MANUFACTURING COMPANY

4069 Hollis Street, Oakland, California

CP is fully protected by patents and trademarks*

It will pay you to **LEAP** *into this profitable new business...*

"LIGHTWEIGHT AGGREGATE"

...but LOOK first

HERE'S WHAT YOU SHOULD KNOW!

There are hundreds of different types of clays and shales—all with different bloating characteristics.

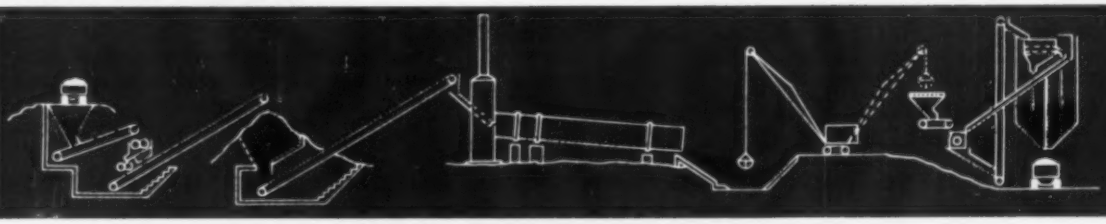
The selection of the process for preparing lightweight aggregate of the proper characteristics and size is determined by the raw material and must be made with care. McNally Pittsburg researchers, designers, and engineers have conducted a careful study of the best processing methods, and the design and construction of plants and equipment for the profitable manufacture and processing of lightweight aggregates in all parts of the country.

Last year there wasn't enough lightweight aggregate to "go around."

America's greatest Building Boom is just getting under way—and no end in sight for at least 10 years.

Builders and architects are fast turning to concrete and blocks made with lightweight aggregate!

That's why the wise operators are saying, "Let's get into a new business,'LIGHTWEIGHT AGGREGATE.'"



"Ask the men who know"

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Gentlemen:

Please send brochure on Lightweight Aggregate plants. ☐

Desired capacity of plant per day is _____.

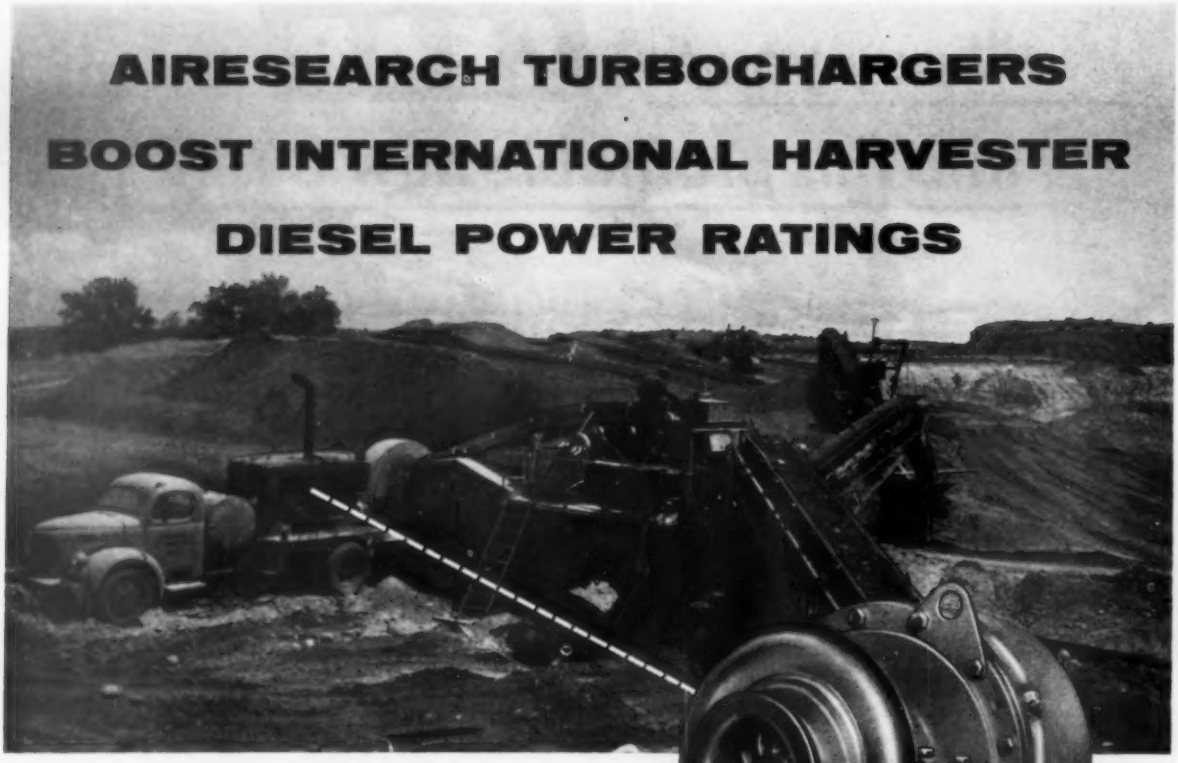
Shale ☐ Clay ☐

Name_____ Title_____

Company_____

City and State_____

AIRESEARCH TURBOCHARGERS BOOST INTERNATIONAL HARVESTER DIESEL POWER RATINGS



AIRESEARCH TURBOCHARGED *International Harvester UDT 1091 diesel is used to power this rock crushing equipment 5000 feet high at Pueblo, Colorado. Rock crushed is from 10 inches maximum to one inch minus with a 40% crush. The AiResearch turbocharger has increased the rock crusher's production by 20%, and not only boosted horsepower 20 – 30% over the diesel's previous output at that level but actually raised it over its sea-level rating. Approximately 1800 tons of rock are being crushed in eight hours by the turbocharged UDT 1091 compared with 1400 tons in an equal period with a non-turbocharged unit. The AiResearch turbocharged UDT 1091 prevents stalling under heavy loads and has operated for over 2500 hours at elevations in excess of 5000 feet with no "down time."*

AIRESEARCH C-60 TURBOCHARGER NOW AVAILABLE ON INTERNATIONAL HARVESTER UDT 1091 DIESEL ENGINE

Installation maintains sea-level output up to 12,000 feet with an important decrease in fuel consumption

AiResearch turbochargers have an outstanding record of operation in the field. Features include turbine wheels of unmatched efficiency, air-cooling which eliminates the need for complicated plumbing and ease of installation and maintenance. Thermal loading on the engine is lower by comparison than any other turbocharging or supercharging installation. Your inquiries are invited.

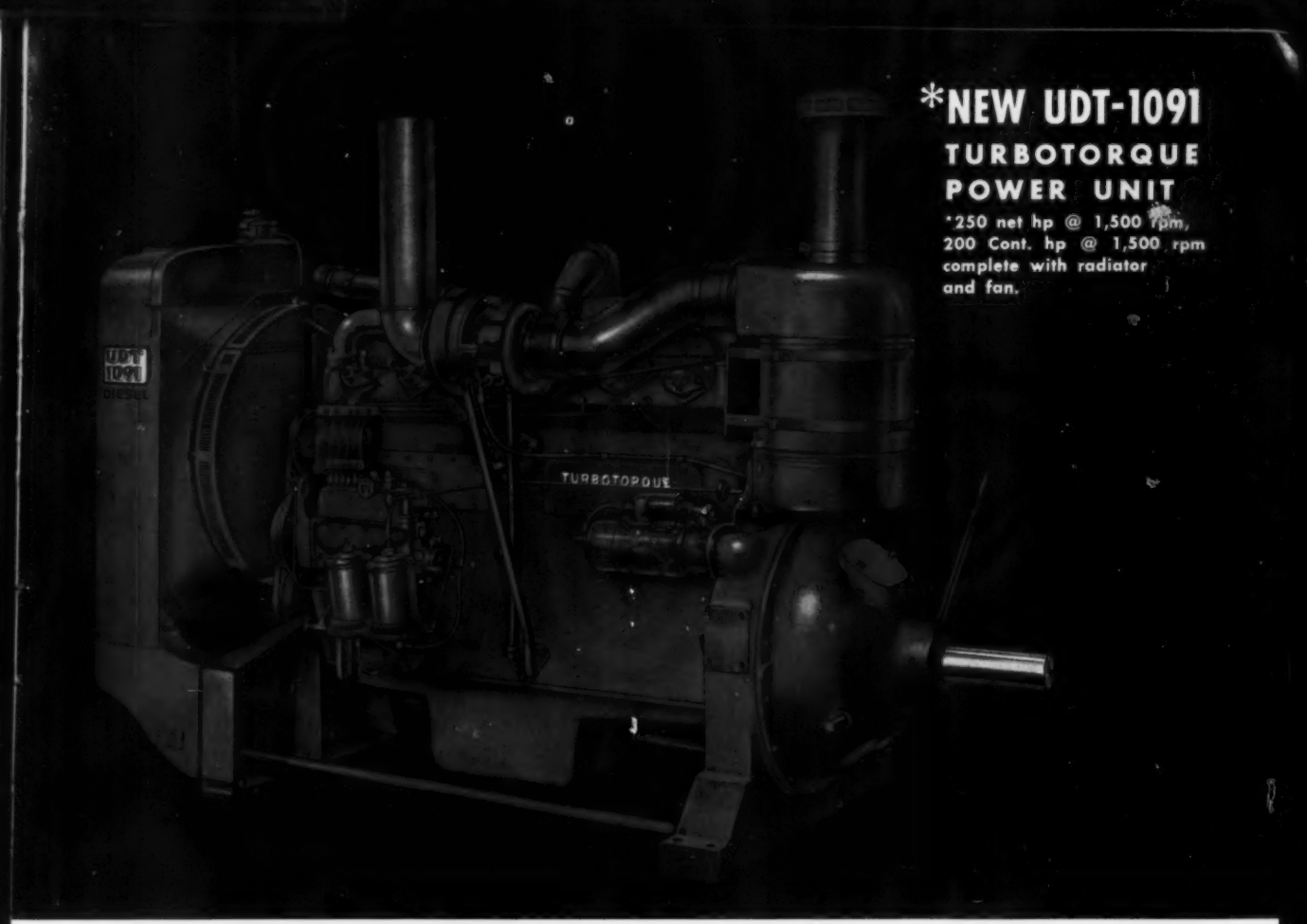
BASIC SPECIFICATIONS FOR AIRESEARCH TURBOCHARGERS					
MODEL	F-51	C-60	A-60	E-100	B-100
Diameter — in. nom.	10	11.5	15.25	15.1	15.4
Length — in.	10.5	12.9	16.75	14.7	17.1
Weight — lb.	40	95	125	112	135
Output — lb/min. (Standard Conditions)	29-51	30-60	38-60	50-100	60-100

THE GARRETT CORPORATION

AiResearch Industrial Division

9225 South Aviation Blvd., Los Angeles 45, California

DESIGNERS AND MANUFACTURERS OF TURBOCHARGERS AND SPECIALIZED INDUSTRIAL PRODUCTS



New 250 hp *Turbotorque International . . . power cost-cutter for your big crushers

Now—lower cost, more dependable power for your big crushers—the new 250 hp Turbotorque International UDT-1091 power unit. And that's on-the-job shaft horsepower—not the inflated laboratory variety against which big deductions must be made for fan, radiator, accessories, plus altitude and air temperature.

This instantly available 250 hp, along with an extra-large counterbalanced crankshaft and heavy flywheel, carries you through peak loads that stall lighter weight engines. As a result, you can make full use of the continuous duty 200 hp rating for crushing more rock at lower cost.

The UDT-1091 has all the features that have made the 200 hp naturally aspirated UD-1091 a favorite diesel for crushers. In addition, it has a water-cooled oil temperature stabilizer as regular equipment and a radiator with greatly increased cooling capacity. The efficient exhaust-gas-driven AiResearch turbocharger moves 60% more air through the big 14-in. diameter air cleaner. This air is packed into the cylinders for minimum fuel consumption and higher power with lower exhaust gas temperatures.

Get the full story on the new UDT-1091 and the other 17 International pit and quarry engines from your nearby International Power Unit Distributor or Dealer. You'll find his parts and service support as dependable as the engines he sells. Call him soon.

INTERNATIONAL®

International Harvester Company
180 North Michigan Ave., Chicago 1, Ill.

CONSTRUCTION EQUIPMENT

A COMPLETE POWER PACKAGE: Crawler and Wheel Tractors . . . Self-Propelled Scrapers . . . Crawler and Rubber-Tired Loaders . . . Off-Highway Haulers . . . Diesel and Carbureted Engines . . . Motor Trucks . . . Farm Tractors and Equipment.

MURPHY-DIESEL POWER

for the tough jobs

· Crushing aggregate to the small sizes required for the 17,900 ft. earth embankment Hartwell Dam takes heavy-duty, economical power to assure maximum output at lowest cost. That's why Clement Bros., South Carolina producer, uses Murphy Diesel Power for their portable crushing and screening unit operating near Hartwell, Georgia.

When it comes to heavy-duty service, you can't beat Murphy Diesels for their dependability, fuel economy, trouble-free operation and long life, *unmatched by any other engine of comparable size.* Ask your Murphy Diesel Dealer to explain Murphy's many exclusive advantages before you decide on an engine.

371RO

MURPHY DIESEL

HEAVY-DUTY POWER for Rock Crushing

Murphy Diesel engines and power units are available in sizes from 96 to 264 H.P. with engine speeds of 1200 and 1400 rpm. "Packaged" generating units are available with capacities ranging from 64 to 165 K.W.

MURPHY DIESEL COMPANY

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Throughout the Nation

Ski lift operators stress safety when it comes to buying wire rope. Too many lives are at stake. So they buy . . .

A Safe Lift

Even though you don't operate a ski lift, false economy can be costly in your rope purchases, too. For a rope failure can cause personal injury . . . wreck your equipment . . . throw off your entire work schedule . . . and affect employee morale. Yes, a "bargain" wire rope may save you money, yet cost you your peace of mind. Don't take a chance. Buy a rope that's a quality rope—buy Wickwire Rope.

CF&I

WICKWIRE ROPE
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PRODUCT OF WICKWIRE SPENCER STEEL DIVISION
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5050

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WICKWIRE SPENCER STEEL DIVISION — Boston • Buffalo • Chattanooga • Chicago • Detroit • Emlenton (Pa.) • New Orleans
New York • Philadelphia

LOOK FOR THE YELLOW TRIANGLE

High altitudes, narrow benches severely test this Michigan, yet every day it loads

400 tons of rock weighing 5,400 lbs per cubic yard

Up in the scenic Sapphire Mountains of southwestern Montana, Cummings-Roberts Company has one of the toughest rock-loading jobs you could find anywhere.

Part of the time, they blast and load coarse mountain-top granite . . . summer and early fall, they load fluorspar. No one needs to detail what a severe test the heavy, rough granite overburden gives to *any* loader. Fluorspar, however, is even worse. A heavy rock mineral, it weighs 5,400 pounds per cubic yard—over 850 lbs more per yard than in-bank granite (and 2,200 lbs more than pit-run gravel).

Proved by demonstration

Over the years, Cummings-Roberts has tried just about every kind of loader made. Last year to increase efficiency, their Michigan distributor, Miller Machinery Co., Missoula, suggested a Model 175A Michigan Tractor Shovel. "Frankly," Cummings-Roberts officials told them, "we don't believe *any* rubber-tire unit can load the stuff, much less do the work day in and day out. But we'll give it a try."

Result? John Taber, General Superintendent, wouldn't let them take the Michigan off the job.

Heaped loading assures proper blending

Today, the 133 hp 2¾ yard Michigan handles *all* loading of the super-heavy fluorspar. Production, with trucks on 600 ft one-way hauls to crushing mill, averages 400 tons per 7-hour day. The fluorspar, incidentally, varies considerably in grade from place to place through-

out the mine. It must be blended to give the grade desired for shipment . . . and this assignment goes to the Michigan, too. Its 27 mph mobility is a vital asset on this scattered loading; trucks never wait more than a few minutes for loading service.

Strips granite overburden — 500 tons per day!

In late autumn and sometimes in spring, the Michigan strips the granite overburden. Output averages *500 tons* per 7-hour day.

Downtime negligible

With all this rugged loading of super-heavy material, plus repeated back-and-forth maneuvering on narrow benches, plus continuous work at high 6,800 to 7,000 ft altitudes, the torque converter equipped Michigan has posted an excellent mechanical record. *To date, it has had only one minor breakdown!*

Also tows compressors, speeds other odd jobs

Operator Don Lindblom likes Michigan's powershift transmission, says its bucket action is the best he's ever worked with. "You can tip it back and fill it easily," he says. "I like the fact also that it takes only half-an-hour per day to refuel and lubricate." Foreman Waino Lindblom adds, "The Michigan has done a nice job for us! We particularly like its truck-like speed in moving from bench to bench." This mobility gives the Michigan some "spare time" to handle maintenance jobs scattered along 15 mi of mountain roads—cleaning rock rubble off benches so trucks and wagon drills can get through . . . hauling air compressors . . . digging culverts . . . even plowing snow.

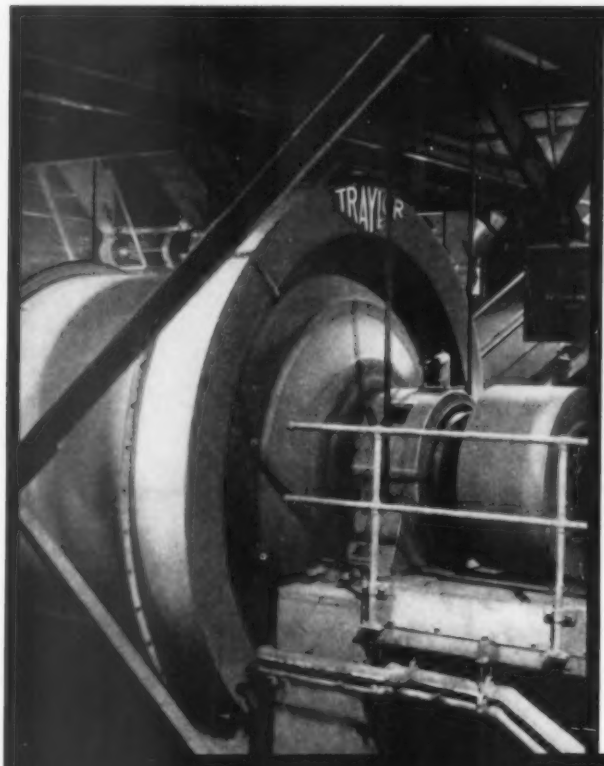
Got a tougher job than this?

There *may* be a tougher materials-handling job than loading granite and fluorspar . . . but we're willing to bet a Michigan Tractor Shovel can do it faster, better, at lower cost than any other machine. To prove it, your Michigan Distributor will be glad to arrange a demonstration at *your* convenience. *You pick the jobs.*

CLARK® EQUIPMENT

Michigan is a registered trade-mark of
CLARK EQUIPMENT COMPANY
Construction Machinery Division
2479 Pipestone Road
Benton Harbor 33, Michigan
In Canada: Canadian Clark, Ltd.
St. Thomas, Ontario

the big league ball player has his equipment custom-made because he gets something **EXTRA**



the profit-wise operator

BUYS TRAYLOR MILLS because they provide something extra, too

Leading producers know that mills Traylor-made for their job provide an extra degree of efficiency that results in extra profits on all grinding operations.

Available in sizes to meet practically every need, Traylor Grinding Mills are built in a wide variety of types including: Ball, Rod, Compartment and Tube Mills for wet or dry . . . coarse or fine grinding. Write today for bulletin No. 11-121.

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the experts agree . . . there's nothing like

TRAYLOR-MADE

equipment for peak performance

A Traylor leads to greater profits

Why Wyandotte Chemical Corp. chose this dozer *(a Michigan)*

"Like most quarries, we have a lot of widely-scattered, repetitive jobs to do," writes William Hagen, veteran manager of Wyandotte's big Alpena, Michigan, limestone quarry. "Trouble was, our crawler-dozers just couldn't handle 'em efficiently—moving, as they must over rocky surfaces, at only a couple of miles per hour. And the cost of track maintenance was pretty awful. Major cause of track wear is travel, of course . . . so we tried to limit *both* as much as possible by putting a crawler on each operating level and another on the stockpiles. Didn't help much, though. Breakdowns would still upset our schedules *several days per week*. So we decided to look at some rubber-tire dozers." They tried one type. It was unsatisfactory. Then Wyandotte's local Michigan Distributor, Michigan Machinery & Equipment Co., arranged an on-the-job demonstration.

Makes hour crawler move in 7 minutes

"From the moment our trial Michigan drove off the flatcar, it was *busy*," Hagen continues. "First job on the docket was leveling a dump area on our macadam storage pile. The Model 180 dozed enough area to last an 8-hour shift —in only 28 minutes! Then, because *two* of our crawlers were down for repairs that day, we drove the Michigan a mile to our shovel loading area. *In less than 4 minutes* it was at work, cleaning up ahead of the 6 yard electric shovel and opening the way for trucks. Half an hour later, we moved back to macadam storage —a 3-minute trip this time. One of our crawlers would have taken a whole hour for the 2 mile round trip alone! Later, the Michigan assisted in moving our big quarry shovel; transfer of the power feed cable and area cleanup were handled faster than ever before. We also used the Model 180 Dozer to move drilling machines, air compressors and shanties . . . to strip shallow overburden . . . clean around the surge bin . . . maintain roads . . . and to level the flux stone stockpile. Nowhere in these operations did the Michigan have a bit of trouble. With performance like *this*, we were sold!"

Only 1 repair job in 5,800 hours

Hagen finds their Michigan today does all of these tasks and many more around this 450-acre quarry. The Model 180 actually works 16 hours a day, 7 days per week. Quarry Superintendent B. C. Raymond estimates its tire wear to be *1/6 as costly* as track maintenance on the crawlers. Its mechanical efficiency has been excellent . . . in the past year, it has been down for repairs *only once*. Operators say "Michigan drives like a new car . . . avoids constant jarring of a crawler . . . gets us on the spot *fast* . . . has fine visibility fore and aft. *We like it!*"

Want to move in on bottlenecks too?

We'll bet a Michigan Dozer can break production bottlenecks for *you*, too. Won't cost you a cent to find out—your local Michigan Distributor will be glad to arrange a thorough demonstration. You pick the time. You pick the job. No obligation, of course. And ask him about the popular Clark Lease-Purchase Plan, which lets you put a Michigan to work without investing a penny of capital. Other finance plans available—choose the one you like best!

Michigan is a registered trademark of

CLARK EQUIPMENT COMPANY
Construction Machinery Division
2479 Pipestone Road,
Benton Harbor 35, Michigan
In Canada: Canadian Clark, Ltd.,
St. Thomas, Ontario

CLARK® EQUIPMENT

JAEGER "600" ROTARY easily powers dual 4" drill rig in 18' limestone ledge at Nelson Brothers quarry, Lathrop, Kansas. Compressor maintains plenty of reserve power behind the drills at characteristic slow, economical operating speeds.

How Jaeger air cuts drilling cost

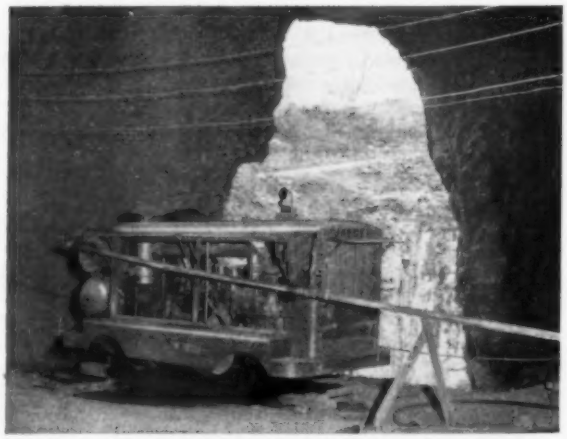
Same mobile "600" saves money in quarry and on 450,000-ton excavation for Turnpike

With its Model 6-71 GM diesel engine easing along at fuel-saving speeds that never reach 1650 rpm, this truck-mounted Jaeger "600" rotary compressor powers two 4" drills at top production efficiency in limestone quarry supplying concrete and road aggregates.

Over long hours of steady drilling, the slow-speed, efficient operation of the Jaeger "600" (1650 rpm full load speed instead of 1750-1800) means substantial savings in fuel and engine and compressor wear. These savings were repeated when Nelson Brothers, the owners, shifted their mobile rig to a 450,000-ton rock excavation project for the Kansas Turnpike.

Slow-running, efficient performance, resulting in fuel economy, fewer fpm of engine piston travel and thousands fewer compressor revolutions per hour, is characteristic of all Jaeger rotaries. Smaller units (125, 250 and 365 cfm) deliver full volume at 1700 rpm versus 1800 to 1950 rpm in similar compressors having no more than equal, and often less, air capacity.

It will pay you to make your next compressor a Jaeger. Call or visit your Jaeger distributor for full details and prices, or write us for Catalog JCR-5.

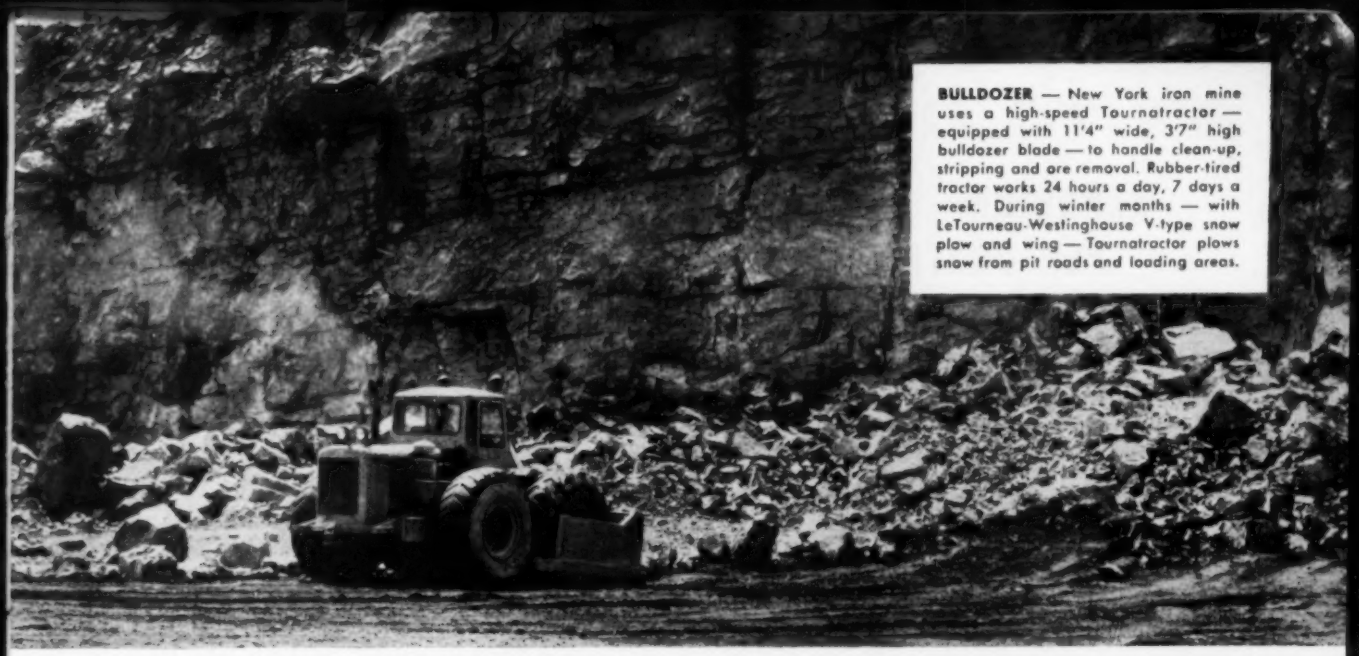


LOGS 400' (IN 12'-18' DEPTHS) PER 8-HOUR SHIFT, IN HARD MISSOURI LIMESTONE: Using only 36 gallons of fuel per 8 hours, Jaeger "600" powers two 4" drifters to this average daily production in Federal Materials Company underground quarry, Cape Girardeau, Mo. Jaeger slow-speed, high efficiency performance saves fuel and wear on every job.

THE JAEGER MACHINE COMPANY

602 Dublin Avenue, Columbus 16, Ohio

PUMPS • CONCRETE MIXERS • SPREADERS • FINISHERS • TRUCK MIXERS



BULLDOZER — New York iron mine uses a high-speed Tournatractor — equipped with 11'4" wide, 3'7" high bulldozer blade — to handle clean-up, stripping and ore removal. Rubber-tired tractor works 24 hours a day, 7 days a week. During winter months — with LeTourneau-Westinghouse V-type snow plow and wing — Tournatractor plows snow from pit roads and loading areas.

Are you using 2 tractors where 1 would do?

SCRAPERS — At a southeastern open-pit phosphate mine, owners use 2 Tournatractor-drawn scraper teams for constructing levees around waste ponds. Optional LeTourneau-Westinghouse double-drum PCU efficiently operates any cable operated equipment.

TOWS EQUIPMENT — At a large midwest silica mine, Tournatractor also cuts downtime for air-compressors and other heavy equipment by moving them from one location to another *fast*. Tractor's big, low-pressure tires cross RR tracks, pavement, etc., without damage.

ANGLEDOZER® — Leading western copper mine uses Tournatractor — equipped with Angledozer blade — for clean-up of railroad tracks and loading area around widely-scattered shovels. 14'10" wide, 3'3½" high Angledozer blade can be angled 20° right or left.

SWITCHTRACTOR* — A southern uranium mine's Tournatractor—equipped with type "E" railroad coupler — spots ore cars in-between dozing chores. This versatile rubber-tired tractor can move 5 loaded or 18 empty cars up a 1 per cent grade.

This versatile rubber-tired LeTourneau-Westinghouse Tournatractor® can handle your scattered pit clean-up and road-maintenance jobs twice as fast as slower-moving crawlers. Here's why:

"Go-anywhere" mobility

High-speed Tournatractor *drives everywhere under its own power* — is never more than a few minutes away from its next assignment in your pit area. Rubber-tired tractor travels across pit floor, over railroad tracks, air-drill hoses, pavement, without damage.

Handles wide variety of jobs

With a L-W attachment to fit almost any work assignment, Tournatractor keeps busy productively all year-around. Use it for spotting rail cars . . . for fast push-loading or towing service . . . for heavy dozing to improve or construct haul-roads, detours or drainage. You'll find a single Tournatractor handles more work over a wider area — without excessive tractor moving expense — than 2 or more crawler-tractors! Why use 2 where 1 would do?

See Tournatractor in action

Why not let us arrange for a demonstration? See for yourself how LeTourneau-Westinghouse Tournatractor can lower costs and increase production at your pit. No obligation.

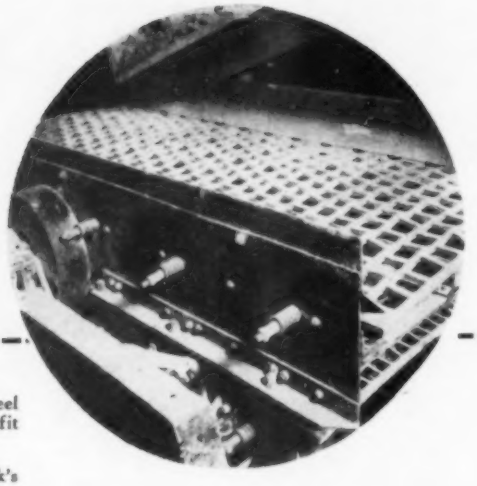
*Trademark CT-1495-M-1

LeTourneau-WESTINGHOUSE Company, PEORIA, ILLINOIS

A Subsidiary of Westinghouse Air Brake Company

WHERE QUALITY IS A HABIT

HENDRICK PERFORATED PLATE PAYS OFF!



Here's how Hendrick H Quality Perforated Steel Plate can often mean the difference between profit and loss for your screening operations:

* Hendrick H Quality Steel comes from Hendrick's wide experience in selecting and specifying the best analysis of steel for the aggregates industry

* Hendrick H Quality Perforated Plate is available in high carbon steel, heat-treated after perforating for longer life

* Product uniformity is assured by uniformity of mesh throughout life of the screen

* Full clearance of Hendrick H Quality Plate practically eliminates blinding

* Faster deck changes . . . lower labor cost

* Large open area assures maximum protection

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Perforated Metal • Perforated Metal Screens • Wedge-Slot Screens • Hendrick Wedge Wire Screens • Architectural Grilles • Mitco Open Steel Flooring—Shur-Site Treads • Armorgrids • Hydro Dehazers • Petrochemical Column Internals

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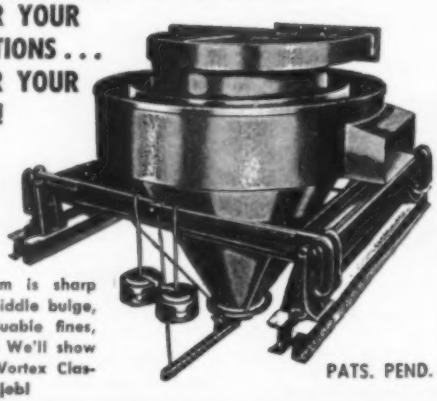
MOST EFFICIENT BY ANY MEASURE FOR SINGLE OR MULTIPLE SPLITS!

COMPARE RESULTS . . . COMPARE COSTS . . . AGAINST ANY OTHER SAND GRADATION EQUIPMENT! AFTER SUCH COMPARISON, YOU, TOO, WILL BUY AUTO-VORTEX CLASSIFIERS . . . WHATEVER YOUR SPECIFICATIONS . . . WHATEVER YOUR PROBLEMS!



If your problem is sharp splits, excess middle bulge, or loss of valuable fines, write us today! We'll show you how Auto-Vortex Classifiers do the job!

PATS. PEND.

CHARLES E. WOOD COMPANY
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PLATEGRIP

PLATE FASTENERS FOR CONVEYOR BELTS

Make strong dust-tight, water-tight joints in belts of any width. Special design spreads tension uniformly across belt, allow natural troughing of belt and assures smooth operation over flat, crowned or take-up pulleys. Sizes for belts of from 1/4" to 1" thickness. *Write for Catalog Sheet.*

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CONTRACT CORE DRILLING

EXPLORATION FOR MINERAL DEPOSITS
INCLUDING URANIUM & LIMESTONE — ANYWHERE

FOUNDATION TEST BORING

GROUT HOLE DRILLING

Skilled crews and complete stock of core drills and accessory equipment maintained at all times

Core Drill Contractors for more than 60 years

JOY MANUFACTURING CO.
Contract Core Drill Division
MICHIGAN CITY, INDIANA

100% anti-friction drive

gives you bonus push-power... top efficiency

This Adams 550 boosts pit production... keeps haul-roads smoother... carves-out new roads easier... opens snow-clogged routes earlier, than ordinary graders of similar size and power. It cleans-up around pit and plant fast... maintains better drainage. At every speed, Adams transmission, final-drive, and tandems deliver maximum engine-power to wheels, because all gears and shafts turn on ball- and roller-bearings. Control clutches, shafts and linkage also on anti-friction bearings.

Compared to other graders, Adams heavy-duty machines deliver a greater proportion of developed engine-power to tandem wheels. An Adams gives you this bonus work-power because all gears and shafts in transmission, final drive, and tandems turn on anti-friction bearings.

Push bigger loads... faster

Because the Adams' drive has roller- and ball-bearings throughout, very little of its horsepower is lost thru friction. More thrust is made available for pushing bigger loads... for blading deeper... for working faster. Furthermore, with an anti-friction drive, your graders' fuel-cost per unit of work done is correspondingly lower. Finally, longer bearing life cuts maintenance expense and downtime for repairs.

Transmission delivers maximum torque

The Adams transmission provides more power-speed combinations than other graders... 15 speeds... so you can do every grading operation at fastest practical rate. At each speed, transmission delivers maximum torque, because all gears and shafts turn on anti-friction bearings. It is fully constant-mesh... gears always engaged for fast, easy gear-shifts without clashing. Crown-shaved helical gears mate precisely... run continuously in oil... do not "howl"... give extra-long life.

Rear-Axle carries no weight

In heavy-duty Adams graders, 80 to 190 hp, the main rear axles are full-floating — they do *not* carry weight of the grader. Instead, rear-end weight is borne by sturdy axle carriers, consisting of two concentric, tubular-shaped, steel housings — one inside the other. Tandems oscillate at will on the two axle carriers. Grader keeps all four tandem wheels on the ground, even in roughest terrain... driving, pushing, working all-the-time.

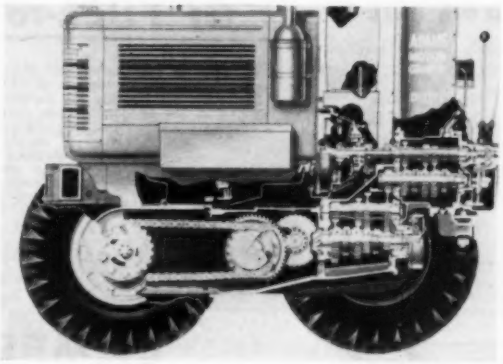
Inside the axle-carriers, driving-axles float "free", mounted in anti-friction bearings. They are fully protected from abnormal shocks and stresses of rough terrain... secure against breakage and undue wear.

Ask for demonstration

See how Adams' 15* speeds, with power delivered thru 100% anti-friction drive, give these machines *bonus* push-power... a capacity for work no other grader can match. Let us explain how an Adams saves you money on fuel and repairs... how it can keep producing for you week-in and week-out. 6 models, 60 to 190 hp. Choice of General Motors or Cummins diesel engines on 5 larger models. Call or write for all the facts.

**190 hp POWER-Flow 660 provides infinite number of power-speed combinations (to 27.4 mph) thru torque converter. 60 hp Model 220 has 9 speeds forward, with optional creeper gears... best in its class.*

Adams, POWER-Flow—Trademark AG-1231-M-b



All gears and shafts in the Adams transmission turn on ball-, needle-, roller-, and tapered-roller-bearings.

Main rear axles are mounted on anti-friction bearings, and carry no grader weight. Instead, rear-end weight is supported on concentric, tubular axle carriers. Inner axle carriers are bolted to tandems; outer carriers to final drive housing. Thus, tandems can oscillate free — without putting stress on main axles. 100% anti-friction drive increases available work-power, reduces operating costs.

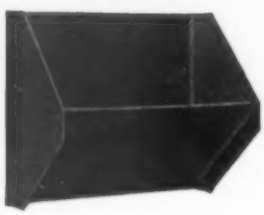
LeTourneau-WESTINGHOUSE Company, PEORIA, ILLINOIS

A Subsidiary of Westinghouse Air Brake Company

WHERE QUALITY IS A HABIT

INCREASE OUTPUT, REDUCE COSTS With STANDARD ELEVATING AND CONVEYING EQUIPMENT

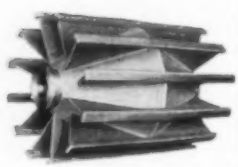
CONTINUOUS ELEVATOR BUCKET STYLE No. 2



This Standard Bucket provides outstanding service under severest operating conditions. It resists wear—assures longer bucket life and lower operating costs. This style of bucket is typical of the complete line of low-cost, rugged Standard Steel Buckets — available in Salem, Style "A," shelf type and other continuous style buckets.

STANDARD WING-TYPE SELF-CLEANING PULLEY

Specify Standard Wing-Type Self-Cleaning Pulleys when ordering pulleys for your operation. They provide these six cost-cutting advantages—all-steel welded construction . . . lower cost . . . less weight . . . greater strength . . . greater resistance to breaking . . . longer life.



STANDARD BIN GATE

Material handling costs less . . . is faster, easier and more efficient . . . with this Standard all-steel gear-operated Bin Gate. Other types of Standard Bin Gates also available.

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Reduce maintenance and material handling costs by converting to Standard equipment. Write today for catalog showing complete Standard line.

STANDARD METAL MFG. CO.
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LOW COST POWER
For Fast "Secondary Breakage"

FREDERICK *CAST SEMI-STEEL* DROP BALLS

Tough, rugged Frederick Drop Balls give you crushing power where you want it, when you want it . . . cut down expensive drilling or blasting . . . give long, economical service with little or no maintenance. Exclusive "Pear shaped" design withstands greater impact—drops straighter. "E-Z Swing" recessed steel eye gives cable protection plus free swinging action. Use Frederick Cable Weights (135 & 250 lbs.) and Frederick Swivels on all size balls for true, safe cable performance. Nickel alloy standard on all 4000 lbs. or over—or special alloys furnished on request. Balls can be furnished with replaceable pins. Special release hooks for free dropping also available.

Write us today for prices and illustrated literature. Order Balls direct or see your nearest Equipment Dealer.

	Wide Range of Sizes and Weights:						
Pear shape (lbs.)	1500	2000	3300	4000	5200	6500	8000
Ball shape (lbs.)	500	1000	2000	5200			
Spherical shape (lbs.) (for magnet use)	470	950	1650	2400	3000	3700	5400

FREDERICK IRON & STEEL, INC.
FREDERICK *Established 1890* MARYLAND
Phone: MOnument 3-5111

CENTRIFUGAL PUMPS • MUNICIPAL AND GRAY IRON CASTINGS

REDUCE YOUR RATIO

OF FUEL-to-CEMENT

In these days of increasing fuel and labor costs, every economy you can make is important. Here is a sure way to SAVE FUEL. Cambridge Gas Analyzers will provide the Burner with a continuous and simultaneous record of the oxygen, carbon dioxide, and combustibles in the flue gas. O_2 analysis serves to warn against excessive air supply; combustibles analysis indicates oxygen demand under all conditions; CO_2 analysis reflects state of calcining process. Cambridge Instruments make uniform kiln operations possible with ease. Savings effected pay for installation in short time.

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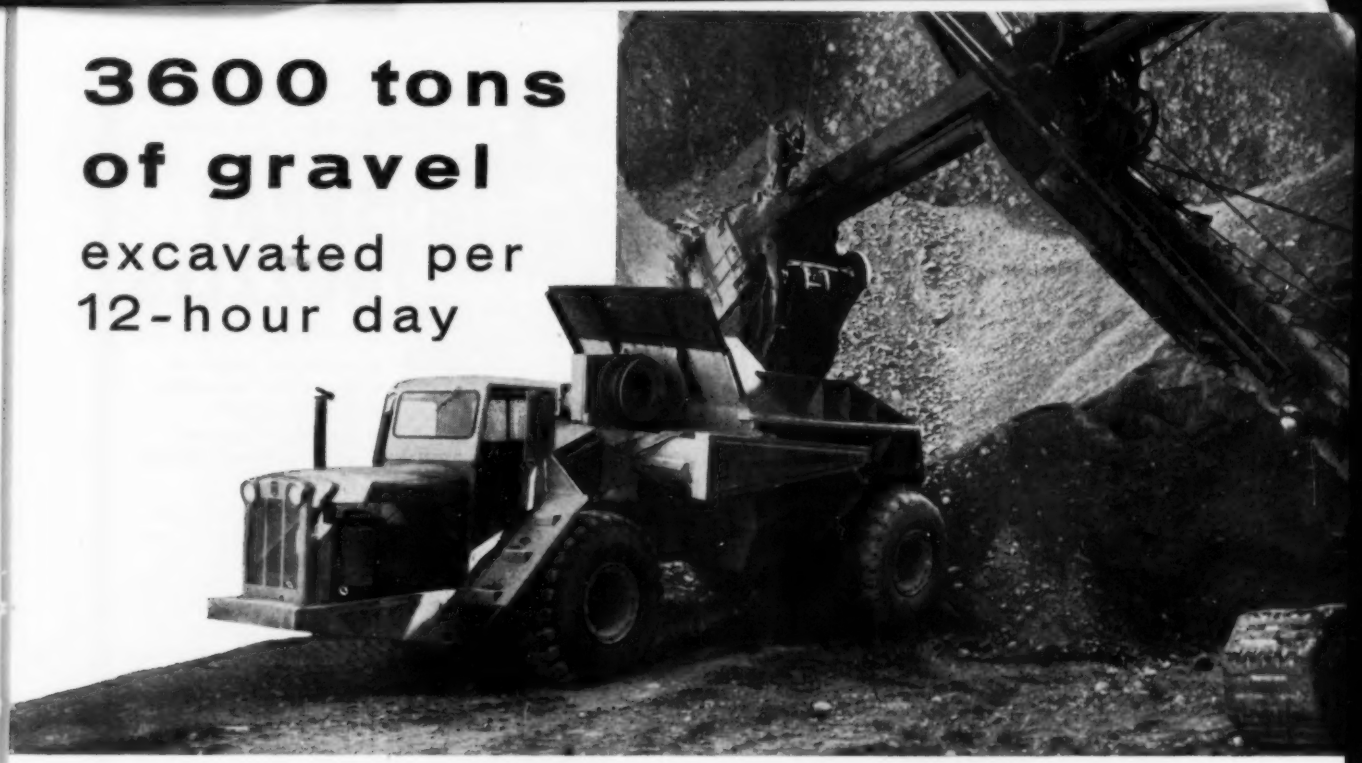
CAMBRIDGE INSTRUMENT CO., INC.
3519 Grand Central Terminal, New York 17, N. Y.

CAMBRIDGE GAS ANALYZERS

PIONEER MANUFACTURERS OF PRECISION INSTRUMENTS

3600 tons of gravel

excavated per 12-hour day



Shovel operator quickly loads C Tournapull Rear-Dump with 19 tons of bank gravel. Low rear entry of bowl permits easy swing-out of empty dipper — even without closing door.

L-W hauler dumps load of gravel and rock into grizzly. With electric hoist, bowl can be lifted for full, instant dump, or controlled at a reduced angle for slow, precision feeding.

After 29 years of continuous digging in the same pit area, pit still produces 3600 tons of "pay dirt" per 12-hr. day. The last nine years, pit has been operated by Valley Sand and Gravel Co., Waukesha County, Wis. Valley's hillside excavation runs about 80′ deep. Company officials estimate it will be excavated at least another 30′ before digging operation is relocated to a new pit area.

Two LeTourneau-Westinghouse Rear-Dumps — one 22-ton model "C", and one 11-ton "D" — are setting a fast production pace by handling all hauls from pit to grizzly. Company uses another L-W Rear-Dump for hauling processed materials to stockpiles.

Haul heaping loads up 10% grade

In typical performance, C Tournapull® Rear-Dumps are loaded with 5 passes of 2½-yd. shovel — getting about 12½ bank yds. (19 tons). Three passes load the "D" with 7½ yds. (12 tons). Rear-Dumps haul 1100′ from pit floor . . . up a 10% grade . . . to grizzly. Except for delays at grizzly, each machine makes 9-10 trips per hour. Combined production of the 2 units averages 200 yds. (300 tons) per hour . . . 3600 tons per day.

"Outlasts ordinary trucks 10 to 1," says superintendent

Until 1952, Valley Sand and Gravel Co. used ordinary trucks for their rough pit haul work. Each year they experienced heavy maintenance expenditures, amounting to thousands of dollars. In 1952 . . . in an effort to step-up pit production and cut maintenance expense . . . they purchased 2 L-W Rear-Dumps. These rugged off-road haulers proved so successful, they now operate 3 of them.

Superintendent Carl Darrow says, "Tournapull Rear-Dumps outlast ordinary haul trucks 10 to 1. Most truck bodies are too thin. Our work is also too hard on truck tires, transmissions, differentials, axles, springs and drive shafts."

Jim Schmeichen, operator of C Rear-Dump, comments, "It's a good machine . . . does the work, and gives us no trouble. You don't have to worry about breaking a spring."

Get facts for your type work

Check all the facts and figures available from other Tournapull hauler owners, for work like yours. See how these Rear-Dumps can give you more production at far less cost. L-W Tournapull Rear-Dumps are available in three sizes: 11, 22, 35 tons.

DRCR-1338-Q-b

LeTourneau-WESTINGHOUSE Company, PEORIA, ILLINOIS

A Subsidiary of Westinghouse Air Brake Company

Where quality is a habit

NO CONCRETE PIT!

Easiest to MOVE!

PORTABLE TRUCK SCALES

Engineered for rugged use in the field. Low initial cost, no maintenance. Can be used as PITLESS SCALE saves on pit costs.

CAPACITIES: 20 to 52 tons. DECK LENGTHS 18 to 43 ft.

OTHER THURMAN SCALES: Pit • Warehouse • Industrial • Liquid Weighing • Wheelbarrow • Batching • Automatic

Precision Scales since 1918

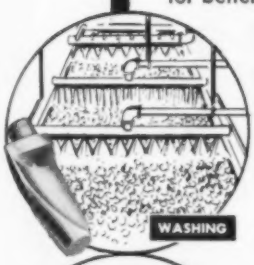
THURMAN SCALE COMPANY

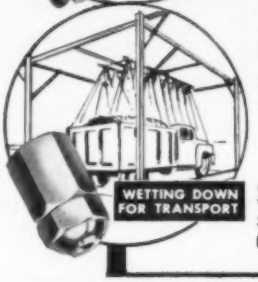
156 N. 5th St. Dept. PI-1 Columbus, Ohio

for better washing . . . dust control . . . concrete curing

SPRAY NOZZLES

from Spraying Systems Co.





- **complete choice of types and capacities to fit your job**
- **greater efficiency with minimum volume of water**

Proper distribution and impact for washing . . . or proper atomization for dust control and concrete curing without unnecessary wetting . . . these are just some of the advantages of having a complete choice of spray nozzle types and sizes to fit your job. For complete information write for Catalog 24.

SPRAYING SYSTEMS CO.
3224 RANDOLPH STREET
BELLWOOD, ILLINOIS

ADMIRO...for Peak Resistance to SHOCK, WEAR, ABRASION

YOU NEED ADMIRO Heat Treated High Tensile Alloy Steel to insure maximum service life for equipment subjected to hard usage. ADMIRO greatly reduces the effect of impact and abrasion. It cuts costly equipment down-time—shows record economies in repair and maintenance.

COMPLETE FABRICATING FACILITIES

Welding — Rolling — Forming

Intricate Shapes Cut to Specification

Recommended Applications: Relining and repairing truck beds, crushers, buckets, wear liner plates, dirt and rock recovery equipment. Special uses in Mining, Quarrying, Cement and Aggregate Plants.

HOPPERS

BINS

CHUTES

Write for Bulletin

ADMIRAL ALLOY STEEL CORP., 850 Euclid Ave., Cleveland 14, Ohio

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For Handling Abrasive, Fine Mesh Solids at Minimum Cost!

- NO PERIODIC ADJUSTMENTS
- ONLY THREE WEARING PARTS
- NON-CLOGGING IMPELLER
- STAINLESS STEEL SHAFT

MODEL RU

Lightning

RUBBER LINED PUMPS

OUTLAST METAL LININGS 5 TO 10 TIMES!

Ideal for handling silica sand, glass sand, coal silt, remnants from classifiers or any other abrasive slurry. The simple design of the pump and its long wearing construction assure long, trouble-free service life, high operating efficiency and a minimum of care. Available in 6" x 8" and 4" x 6" sizes.

A new bulletin completely describing this pump is available . . . write

KANSAS CITY HAY PRESS CO.

Manufacturers of Heavy-Duty Lightning Sand and Gravel Pumps

801 WOODSWETHER ROAD • KANSAS CITY, MISSOURI

Dirt, Corrosion, Low Voltage Problems?

the answer:

Allis-Chalmers "dc operated" ac contactors*

Allis-Chalmers Size 6 starter, NEMA 1 enclosure.

Dc operators in Allis-Chalmers control assure dependable performance because they are not affected by dirt or corrosion on the armature face. Positive magnetic operation reduces contact pitting — eliminates hum and chatter—prolongs mechanical life. The operator picks up at 65% of rated voltage — holds in with as little as 35%.

For Any Low Voltage, High Horsepower Application . . . Allis-Chalmers Modern Control — Sizes 4, 5 and 6

Advanced Electrical Design

ACBO arc-centering blowout sharply curtails arcing time, greatly prolongs contact and chute life — without blowout coils.

Simplified Mechanical Design

Streamlined clapper-type construction permits natural arc rise in arc chute. Sensible enclosure dimensions provide ample wiring space. Easy accessibility simplifies maintenance.

For detailed information on this complete line of modern control, call your A-C Control Distributor or A-C District Office. Or write Allis-Chalmers, General Products Division, Milwaukee 1, Wisconsin.

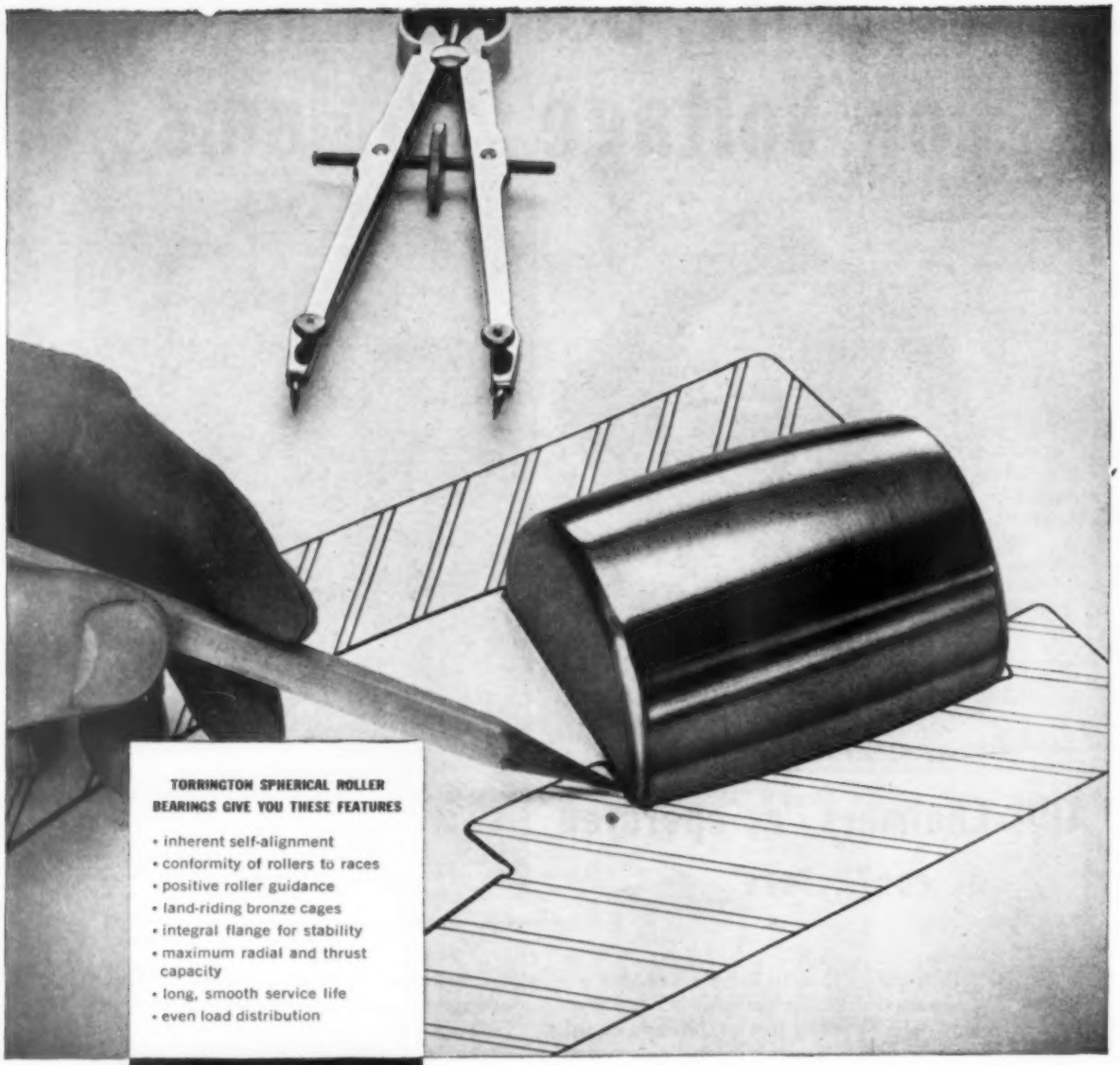
*Self-contained ac to dc circuit. Standard in Size 6, optional in sizes 4 and 5.

ALLIS-CHALMERS

A-C ALLIS-CHALMERS

A5372

ACBO is an Allis-Chalmers trademark.



TORRINGTON SPHERICAL ROLLER BEARINGS GIVE YOU THESE FEATURES

- inherent self-alignment
- conformity of rollers to races
- positive roller guidance
- land-riding bronze cages
- integral flange for stability
- maximum radial and thrust capacity
- long, smooth service life
- even load distribution

Mated perfectly - for life!

Make a point to notice the roller end and center guide flange in a Torrington Spherical Roller Bearing. The perfect mating there means a smoother, longer bearing life.

Roller end and flange surfaces alike are ground to a common spherical radius centered on the common vertex of bearing axis and roller axis. Under all load conditions, the rollers bear lightly but constantly against this flange. This guides the roller positively with minimum friction and prevents skewing. Stress concentrations leading to early failure are avoided, so the bearing will serve you many good turns longer.

This is the kind of feature Torrington builds into its bearings out of its experience with all major types serving in all kinds of equipment. Care for such details is matched only by our care in mating the *right* bearing to the *right* job. In this, your Torrington representative is an expert: call on him when you need help. *The Torrington Company*, South Bend 21, Ind.—Torrington, Conn.

TORRINGTON BEARINGS

District Offices and Distributors in Principal Cities of United States and Canada

DIAMETER OF CAN OR CARTRIDGE	LOADING DENSITY: POUNDS PER FOOT OF BOREHOLE		
	SPECIAL GELATIN 75%	"NITRAMEX" NO. 2	"NITRAMEX" 2H
4½	9.6	11.0	12.5
5	11.8	14.5	15.8
5½	14.2	17.5	19.3
6	17.0	20.8	22.5
6½	19.9	24.5	26.5
7	23.1	28.0	30.8
7½	26.5	32.5	35.3
8	30.2	37.0	40.0
8½	34.0	41.3	45.0
9	38.2	45.3	49.0

Now A New Hard-Hitting Blasting Agent, for tough shooting... better breakage

Du Pont Heavy "Nitramex®" No. 2H*

For quarry shooting where tough bottoms and formations have proved hard to overcome, Du Pont now offers a higher density "Nitramex" No. 2, called "Nitramex" No. 2H.

In field tests this new product has produced noticeably better breakage in such tough shooting material as granite, trap rock, basalt and hard, dense dolomite. Because it also has infinite water resistance, it may be loaded in wet holes as long as necessary before shooting.

The new heavy "Nitramex" No. 2H has a density of 1.80 compared to 1.60 to 1.65 for regular Du Pont "Nitramex" No. 2. The smallest size currently available (4½" x 24") weighs 25 pounds compared to 22 pounds for the regular "Nitramex" No. 2. "Nitramex" No. 2H can be consistently detonated with maximum safety by either a "Nitramon" or a "Nitramite" primer.

For technical information on this newest, strongest member of the Du Pont family of blasting agents, contact your Du Pont Explosives representative or write E. I. du Pont de Nemours & Co. (Inc.), Explosives Department, Wilmington 98, Del.

*PATENT APPLIED FOR

DU PONT BLASTING AGENTS

Products of Du Pont Research

DU PONT

BETTER THINGS FOR BETTER LIVING ... *THROUGH CHEMISTRY*

Legal Decisions

By LEO T. PARKER
Attorney at Law
Cincinnati, Ohio

Cannot Collect

A few weeks ago I recived an interesting letter from an official of a quarry company: ". . . If city officials buy nonmetallic materials, can the seller always compel the city to pay for the materials used by the city?"

According to a late higher court decision, the answer is no. This is so because the higher courts hold that if a corporation contracts to supply materials or perform work for a city, such corpration must know that the city officials have the authority to make legal and enforceable contracts.

For instance, in the leading case of *Newberg v. Warren Company,* 278 Pac. 96, when the city officials refused payment, the sand and gravel company sued the city for the balance due on the account. During the trial the testimony showed that the city charter specified that money for similar purposes should be obained by levying assessments against property owners.

The higher court held the city not liable for payment, and said:

"The city did not guarantee that the property levied against would, at public sale, bring the full amount of the assessments. It only contracted to 'set the legal machinery in motion' and to exercise reasonable diligence to obtain funds. . . The seller was bound to take cognizance of the powers vested in the city by its charter."

Hence, it is certain that neither a state, county, nor city must pay for materials purchased and used contrary to state laws.

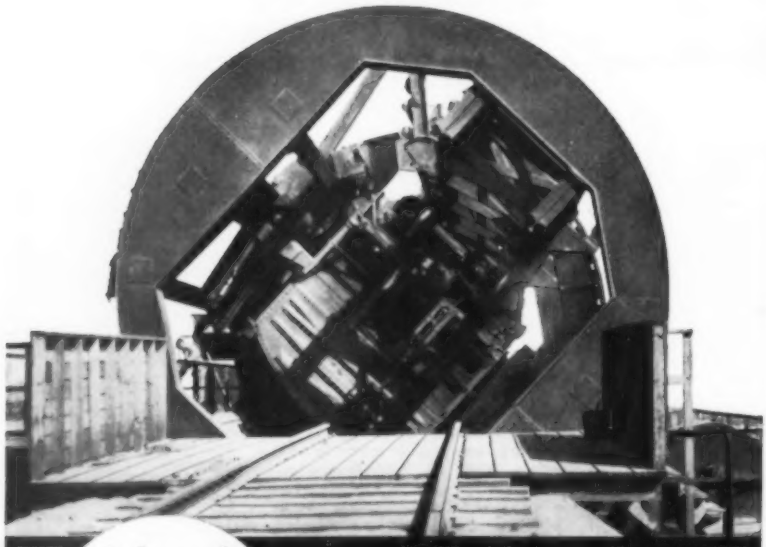
When Employee Is Legal Agent

A reader asked, "Is an employer liable for promises, guarantees, and contracts made by an agent who has no special authority?"

The answer is: A valid "agency" may arise from the general or past conduct of an employer which may result in his liability on contracts made by an employee.

In *Alexander Company v. Medford,* 170 S.W. (2d) 809, it was shown that a company has been engaged for many years in buying sand, gravel, and other materials through an employee who in the past had purchased various materials for the company. Suit was filed against the company by a seller to recover several thousand dollars for materials purchased by this agent, after he had left employment of the company.

During the trial both the agent and the company officials testified that the agent was not in the company's employ at the time these materials were purchased. Notwithstanding this testimony, the higher courts held that the company must pay for the materials purchased by the agent. The court explained that the company had not notified purchasers that the agency had been terminated, and therefore the com-

ROTARY
CAR DUMPER
Rigid and Simple Construction
(No movable platen)

Balanced Design • Economical Operation
RAILROAD CAR SHAKERS
■ Write for Bulletin 200
EASTERN
CONSTRUCTORS, INC.
Poland, Ohio

Sauerman News Briefs

SPECIAL EDITION OF SAUERMAN NEWS

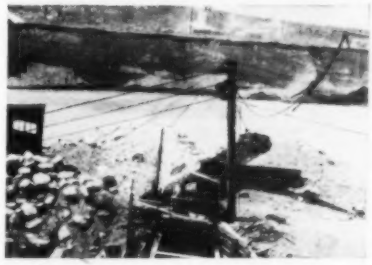
Brief items about the Sauerman Method... Crescent DragScrapers Slackline and Tautline Cableways... Durolite Blocks

Sauerman Bros., Inc. • 634 South 28th Avenue • Bellwood, Illinois, (Chicago Suburb)

4-YARD DRAGSCRAPER ELIMINATES A SHIFT AND UPS PRODUCTION

At the Union Sand and Gravel Co., a Sauerman DragScraper Machine gives Union the production necessary to supply increased plant demand in just one shift. Two shifts were required with their previous installation when a smaller Crescent and hoist were used.

The 4-yd. DragScraper delivers 175-cu. yds. or about 250 tph. when digging 400 ft. from the hopper. Power is supplied by a Sauerman three-drum hoist which has an inhaul speed of 500 fpm. with loaded bucket and a 1,000 fpm. backhaul speed. A 30-ft. tubular steel mast equipped with Durolite blocks forms the head end assembly. Operating cables from the hoist are reeved through the head end Durolites to the rapid-shifting tail bridle system 500 feet away.



A trolley and tail block travel the tail bridle cable. Lateral shifting of the trolley by the third drum changes the Crescent DragScraper's line of operation.

(Condensed from Sauerman News No. 144.)

How MAPCO Digs and Hauls at a Cost of 4 Cents per Ton

Mapco Sand and Gravel Co. is using a 2-yd. DragScraper to work their deposit at a cost of about 4 cents per ton. The company bases this figure on production of 235,000 tons and includes all labor, power, cable replacement and maintenance of hoist and blocks.

The DragScraper Machine is equipped with an electrically operated skid-mounted Sauerman hoist. Power is transmitted by V-belts. This new hoist replaced another Sauerman hoist that was in service for over 25 years.

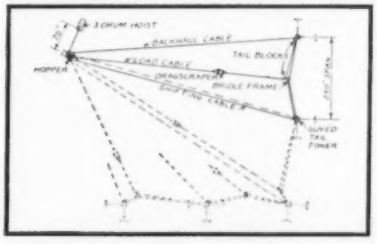
The Crescent DragScraper works the pit and bank face and delivers to a ground level hopper on an average haul of 450 ft.

(Condensed from Sauerman News No. 148.)

DragScraper Supplies Gravel for 82 Miles of Turnpike

More aggregate production was needed by Southern Michigan Materials, Inc. to supply structural and, upon completion, the maintenance and incidental needs for 82 consecutive miles of the Ohio and Indiana Turnpikes.

This demand was met with a new plant and a 5-yd. DragScraper which supplies gravel at the rate of about 275 tph. Digging goes to a depth of 75 to 80 ft. Power is provided by a Sauerman three-drum hoist driven by a 325-hp. diesel. The rapid-shifting bridle provides a means of changing the DragScraper's line of operation by placing the tail block attached to the bridle in another position along the 250-ft. span between the two steel tail towers.

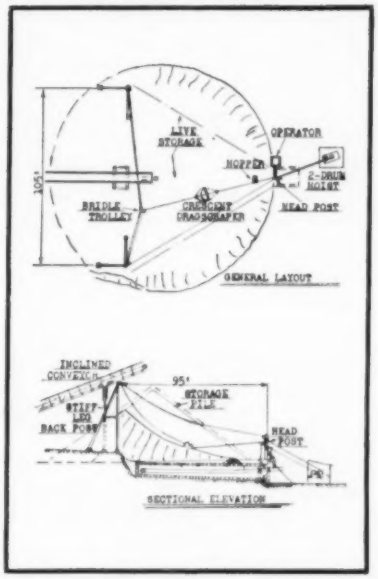


The hoist is pneumatically controlled by the operator from the hoist house. His location gives him excellent visibility of the entire pit and most of the plant.

The parent company, Northwest Materials, Inc., has completely excavated another pit nearby with a Sauerman 2-yd. Slackline Cableway. Northwest also uses a small scraper for stockpiling and reclaiming material from storage.

(Condensed from Sauerman News No. 145.)

Rapid Shifting DragScraper is Engineered to Needs of Silica Sand Producer



The Sauerman Method was successfully applied to the requirements of a prominent silica sand producer, as shown in the drawing above. This Rapid-Shifting DragScraper Machine reclaims raw sand from a 6,000-ton stockpile.

The pile is formed by an inclined conveyor leading from the floor of the quarry to the live storage area. The Crescent DragScraper reclaims from storage to a hopper-fed conveyor in front of the head post.

Before the DragScraper was installed, the raw sand frequently bridged across the hopper. Such interruptions in the flow of raw sand to the plant resulted in costly shutdowns. The Crescent prevents this bridging action and provides a steady flow of material for processing.

The Sauerman Method also permits the company to build up a reserve pile of raw sand sufficient for at least one week's production as insurance against a quarry shutdown.

(Condensed from Sauerman News No. 147.)

MORE NEWS AND INFORMATION

Issues of Sauerman News giving greater detail about the installations on this page are available on request. For full information, tell us your interest or requirements and ask for catalog. Contact Sauerman Bros., Inc., 634 S. 28th Ave., Bellwood, Ill.

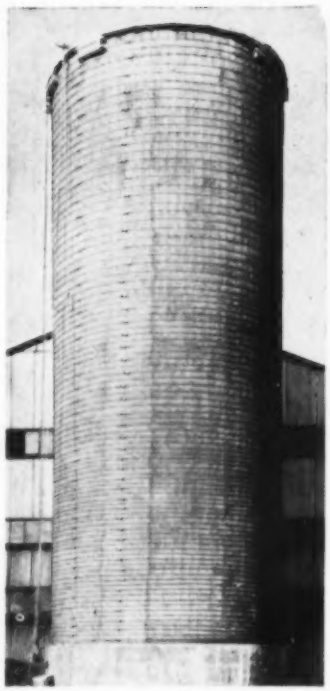
Neff & Fry Silo used for calcined coke

Many of our silos are currently being erected for handling and storing calcined coke. Scores of them have been in use for the same purpose over the years. The photograph shows one such installation in Pennsylvania. It is 24 ft. dia. x 60 ft. high.

There are a number of special problems in designing systems for handling calcined coke and other materials of similar consistency. Our knowledge of the subject can be of great practical value. We'll be glad to communicate or confer with you.

Our silos are constructed of Super-Concrete Staves with diagonal ends which permit steel hoops to impinge directly upon the horizontal joints. As many intervening hoops are installed as needed to met the lateral thrust of the contents. This is clearly explained in our folder, "Bins With the Strength of Pillars." A copy is yours for the asking.

Not exported except to Canada and Mexico.



SUPER-CONCRETE STAVE STORAGE BINS

THE NEFF & FRY CO.
278 ELM ST., CAMDEN, OHIO

✓ . . . check the advantages

for the

"Cape Ann" FORGED

STEEL DROP BALL

- ✓ SPECIALLY DESIGNED
- ✓ GREATER IMPACT
- ✓ ECONOMICAL

2000 to 12000 lbs.

Budget-minded quarrymen specify the "Cape Ann" Drop Ball to insure record rock-breaking efficiency. Equipped with a forged connecting link, protected by a deep recess, adaptable for swivel or shackle. Strong alloy steel pin. Low cable replacements. Furnished complete as shown.

Write oday for full details

Cape Ann Anchor & Forge Co.
Gloucester • Massachusetts

pany remained liable for contracts made by the employee.

The legal effect of this new higher court decision is this: If an employer has in the past approved important contracts made by an agent who leaves his employment, he should at once notify firms, companies, and persons with whom the employee has in the past regularly made binding contracts that such employee is no longer a representative of his firm. Otherwise, the employer remains liable on contracts made by the employee.

Uniform Sales Law

A seller of sand and gravel wrote as follows: "My company is located in the state of New Jersey. I want to know whether our state laws conform with the Uniform Sales Act and also whether or not our company can stop a shipment in transit when we learn that the purchaser is insolvent."

A review of statutes of various states reveals that the state of New Jersey was among the first in 1907 to adopt the Uniform Sales Act. The ultimate purpose of this law in all states is to enable buyers and sellers in all parts of the United States to litigate with the least time, effort, and expense their legal rights and liabilities. Section 54 of the Act states that the unpaid seller has a lien on such merchandise (1) if the goods were sold without a credit agreement; (2) if the terms of credit specified in the contract of sale have expired; (3) if the buyer becomes insolvent; and (4) if the seller has possession of the goods.

Section 53 of the Uniform Sales Act provides that a seller may stop materials in transit if he knows or learns that the buyer is insolvent. This section 53 is applicable although the title to the goods passed to the purchaser on delivery to the carrier, as when goods are shipped f.o.b. the manufacturer's plant. However, contrary to the belief of a majority, this section does not give the seller the legal right to regain title to the merchandise.

Therefore, while a seller of nonmetallic products may stop goods in transit and enforce a lien on the goods to secure payment by an insolvent purchaser, the seller's right to "stoppage in transit" ends the instant the goods are placed on a siding for delivery to the purchaser; but he still has a lien to secure payment if the purchaser refuses to accept delivery from the carrier.

GENERAL

NYGEN® TIRES

move 465,000 cu. yds. of dirt to meet 120-day deadline date for Berghuis Construction Co.

Stronger than Steel
NYGEN®
... the most indestructible cord ever built into a tire ... exclusive with
GENERAL

Where time is a vital factor, the sure-footed, crawler-like traction and flotation of General Truck Tires can be counted on to get the job done faster and for less.

Built tougher for the toughest jobs with exclusive Nygen Cord construction and featuring extra wide treads for positive traction, Generals are unexcelled for drive, durability and dependability.

Put Nygen-built General Truck Tires to work tomorrow on your toughest job and let them prove their worth in time saved and profits made.

THE GENERAL TRUCK TIRE

specify Generals on your new equipment

THE GENERAL TIRE & RUBBER CO. · Akron, Ohio

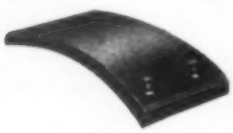
when heavy-duty equipment uses J-M Brake Blocks

Johns-Manville Brake Blocks deliver the safe, dependable performance that frees your drivers from worry about personal danger. And remember, it's much easier to replace linings than good operators. You get more out of your equipment too, in terms of working time and "pay loads" handled.

That's because these rugged, durable J-M Brake Blocks are engineered for the job . . . and designed for outstanding performance plus maximum service life on trucks, shovels and heavy machinery.

Johns-Manville makes a wide range of industrial friction materials such as linings, facings, cones and segments that are "original parts" on many famous makes of heavy-duty units. For fast, easy replacement, they are available in Johns-Manville Assembled Sets that assure greatest safety in your equipment.

See your Johns-Manville Distributor for data on J-M Brake Linings and Clutch Facings for industrial equipment, or write Johns-Manville, Box 14, New York 16, N. Y. In Canada, Port Credit, Ontario. Ask for booklet FM-35A.



Johns-Manville
INDUSTRIAL FRICTION MATERIALS

Law of Insurance

A reader asked this question: "If a company pays insurance premiums for many years, can the insurance company legally refuse payment for a loss?"

An insured may pay premiums on insurance policies for many years feeling secure; yet if a loss occurs, there are many reasons why insurance may not be collected. For example, if for any reason a policy holder increases the normal risk originally assumed by the insurance company, the insurance policy automatically becomes void and nonpayable. This is important law because the normal risk originally assumed by the insurance company may be unintentionally increased by the insured in a multitude of ways and means. In fact, any material violation of a clause in an insurance policy may automatically relieve the insurance company from paying a loss.

It has been held that violation of a clause requiring the insured to keep his books in a fireproof safe renders the insurance policy void, and the insured cannot collect any insurance on the policy. Also, any misrepresentation in an application for insurance results in the insurance policy being void and invalid. This law is applicable irrespective of the fact that the insured made the misstatement innocently. See *White, 144 So. 439.* Moreover, the law is well settled that if in any way the insurance company's risk, assumed when the policy was issued, is increased without permission of the insurance company, the policy is void.

Of course, the matter of notifying the insurance company of a contemplated loss is important.

In *Green v. Hartford F. Insurance Company,* 216 N.Y.S. 315, the higher court held that an insurance company need not pay a fire loss where the insured delayed six weeks in reporting the loss to the insurance company.

In *Wainer v. Weiner,* 192 N. E. 497, the higher court held that an insurance policy was rendered void and the insurance company need not pay the loss where the testimony showed that the motor vehicle owner delayed two months in reporting an accident to the insurance company. Also, see *Stacey v. Fidelity,* 114 Ohio St. 633. This court held that if an insured fails to give the insurance company immediate notice of an automobile accident, the

✓ happy balance between dependable performance and moderate cost

ROLLWAY
STEEL CAGE
ROLLER BEARINGS

Tru-Rol *precision, steel-cage, heavy-duty bearing with contoured guide lips assuring true right-line rolling, maintained roller alignment and thin oil film.*

● Rollway's *TRU-ROL* Steel-Cage Bearings afford wide latitude in balancing *dependable* performance, *long* life, and *high load* capacity against *moderate* cost. They rate high in any comparison on a cost-performance basis.

A choice of stamped steel retainers with contoured guide lips, or steel segmented retainers assure true rolling and an evenly distributed *thin* oil film — *big factors in reducing power losses and heating.*

TYPE D

Rollway Metric Series Steel Cage Roller Bearings

● Rollway Metric Series Steel-Cage Bearings offer the greater load capacity of solid cylindrical rollers, plus the true right-line rolling of trunnion rollers turning in a rigid steel cage. There's no roller skew, no pinch out, no cam action. Design permits maximum bearing capacity . . . within small space . . . at moderate cost.

"Crowned" Rollers Relieve End Stress

TRU-ROL offers the extra advantage of a finish-ground "crown" radius on the roller ends. That relieves high end-stress and insures uniform load distribution over the entire length of the roller. The result: *TRU-ROL* Steel Cage Bearings carry heavier loads over longer periods without excessive end-fatigue. They are less affected by slight misalignment or shaft deflection.

Investigate *TRU-ROL* Steel Cage Roller Bearings before selecting any bearing in the medium price range.

Let Rollway Help...

Our complete engineering and metallurgical services will gladly work with you on your problem. Simply write or wire any sales office. No cost. No obligation.

Rollway Bearing replacements are available through authorized distributors in principal cities. Consult your classified phone directory.

ROLLWAY BEARINGS

COMPLETE LINE OF RADIAL AND THRUST CYLINDRICAL ROLLER BEARINGS

ROLLWAY BEARING CO., INC. SYRACUSE, N.Y.

ENGINEERING OFFICES: Syracuse • Boston • Chicago • Detroit • Toronto • Pittsburgh • Cleveland • Milwaukee • Seattle • Houston • Philadelphia • Los Angeles • San Francisco

Crane Wheels?

F85 F-C

Finest Name in Cast Steel!

FARRELL-CHEEK IS YOUR SOURCE!

FARRELL-CHEEK STEEL CO.

HIGHEST QUALITY ELECTRIC FURNACE CARBON AND ALLOY STEEL CASTINGS

FARRELL'S CARBON STEEL CASTINGS

F-C HARD EDGE STEEL CASTINGS

F85 STEEL CASTINGS

RAILROAD CASTINGS Locomotive and Car R. R. Specialty Castings

ELEVATOR, CONVEYOR PARTS Sprockets, Traction Wheels, Chains, Buckets, Rollers, Idlers, Bushings.

GEARS AND PINIONS "True Tooth" Gears and Pinions, Sheaves and Wheels.

CRANE WHEELS Overhead, Gantry, Monorail, Ingot Car, Charging Machine.

STOKER PARTS Feed Screws, Furnace Tools, Flanged Pipe, etc.

HEAVY HARDWARE Complete Line Wire Rope Fittings and Cutters, Bar Benders and Cutters.

YOUR INQUIRY WILL PROMPTLY BRING DETAILED INFORMATION PERTAINING TO ANY OF THE ABOVE FARRELL-CHEEK PRODUCTS

SANDUSKY, OHIO

insurance company is relieved from all liability under the policy.

In fact, an insurance policy is a legal contract between the insurance company and the insured person. A violation by the insured of any sentence or clause in the policy automatically renders the policy void. Hence, it is important that all insured persons, firms, and corporations carefully read each insurance policy and be certain to comply strictly with the terms of the policy.

No Liability

A reader asked this question: "If an employer refuses to comply with state laws which require installation of dust eliminating machinery, is such employer always liable in damages to an employee who contracts silicosis?"

According to a late higher court decision, the answer is no.

For example, in *McKee v. New Idea,* 44 N. E. (2d) 697, it was disclosed that a state law provides that in plants where dust is likely to be injurious to the health or eyes of employees the plant owner must install means of ventilation of sufficient capacity to effect four changes of air each hour.

An employee claimed that he had contracted silicosis while attending to his regular work, and he sued the employer to recover damages. He testified that silica dust arose and was prevalent in the room in which he worked, and that his employer had not complied with the above mentioned state law. In view of this testimony the lower court held the employee entitled to recover $15,000 damages from his employer.

It is interesting to observe that the higher court reversed the verdict because no proof was given that failure of the employer to comply with these state laws was the proximate cause of the employee's contracting the disease.

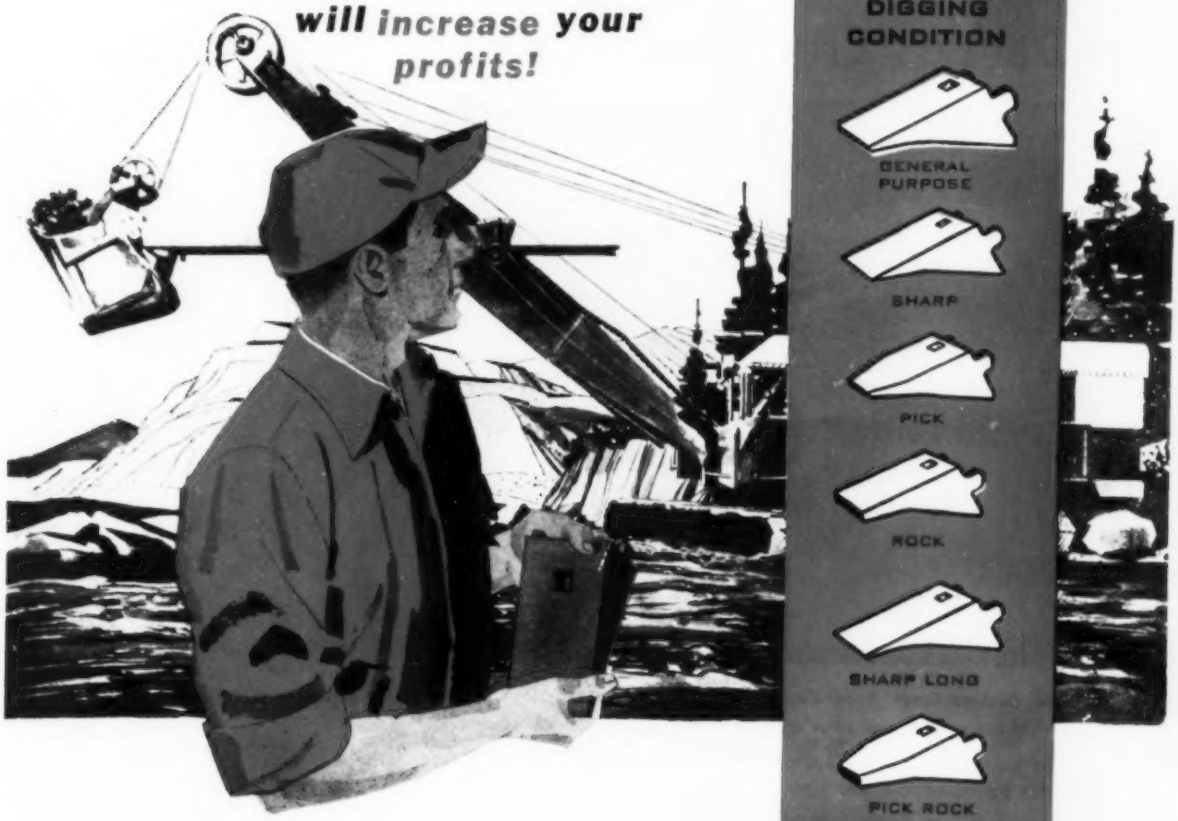
Therefore, it is well settled that although an employer violates a state's safety law, he is not liable in damages for injury or disease to an employee unless the testimony positively proves that the employer's failure to comply with such law was the proximate cause of the employee's injury or disease.

Partnership Liability

A rock quarry owner wrote as follows: "I am getting old and I want a young man as a partner in my business. What can you suggest about this?"

THE RIGHT POINT SHAPE

will increase your profits!



ESCO

OFFERS YOU A POINT SHAPE FOR EVERY DIGGING CONDITION

GENERAL PURPOSE

SHARP

PICK

ROCK

SHARP LONG

PICK ROCK

SHARP FLARED

Put more profit in every pass — select the right point shape for your particular digging condition. There's an *ESCO* point shape to give maximum digging efficiency in any kind of work. You choose from seven shapes — six different sizes. No other point manufacturer offers such a complete selection.

Use the right *ESCO* point shape for your job — on your dragline, dipper, hoe dipper, clamshell, front loader, ripper or dredge. Try several shapes — see which gives you the best results. Your *ESCO* dealer has them all in stock. He'll be happy to give you details.

ESCO points start sharp, stay sharp. You get more dig for your money with ESCO Tested Points because they sharpen as they work.

ESCO®

ELECTRIC STEEL FOUNDRY COMPANY

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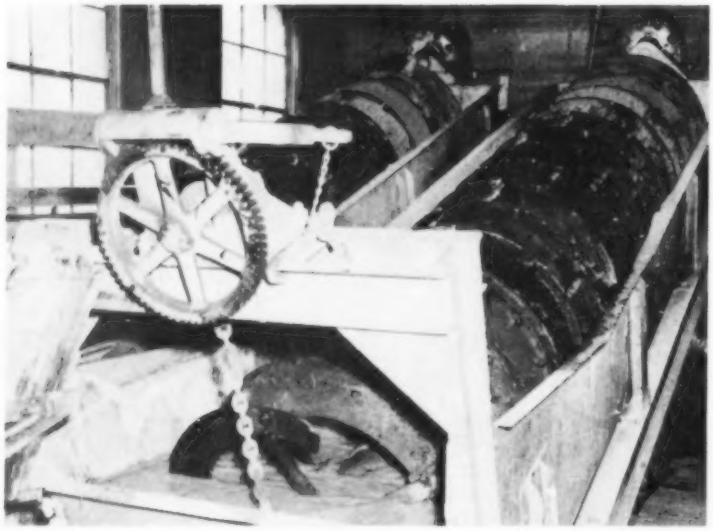
MFG. PLANTS AT PORTLAND, ORE. AND DANVILLE, ILL.

Offices in Most Principal Cities

ESCO INTERNATIONAL, NEW YORK, N. Y.

IN CANADA ESCO LIMITED

AKINS' efficient classification proved by 18 YEARS SERVICE at Deckers Creek Sand Co.



TWO REPEAT ORDERS

The Deckers Creek Sand Co., near Masontown, West Virginia, is a prominent producer of silica sand. In 1938 they purchased three Akins Classifiers. Based upon the results obtained with these the company has since purchased four additional Akins.

FLOWSHEET

Modern methods of washing, classifying, and rod-mill grinding are used. The crusher product goes to 48" Akins Classifiers which make a sand-slime separation. The sand product is fed to a 5'x10' Marcy Rod Mill, with the discharge going to vibrating screens which make a 30-mesh separation. The +30-mesh goes to aggregate plants and —30 mesh to a 54" Akins Classifier. The sands from this classifier are fed to a 48" Akins which makes the final product...5% +30-mesh x 94% +80 mesh.

For efficient classification, long operating life

SPECIFY AKINS

THE ORIGINAL SPIRAL CLASSIFIER

COLORADO IRON WORKS CO.

1624 17th Street • Denver 2, Colorado

AKINS CLASSIFIERS • SKINNER ROASTERS • LOWDEN DRYERS

Sales Agents and Licensed Manufacturers in Foreign Countries

A SUBSIDIARY OF THE MINE & SMELTER SUPPLY CO.

My answer is: "Unless you are personally acquainted with a contemplated partner, it is advisable that you first hire him as a regular employee."

The important advantage of an ordinary partnership business is that two or more persons may unite their money, labor, services, and ability for the purpose of operating a business. On the other hand, a real disadvantage of a partnership is that any one partner is personally liable for the total debts or obligations of the entire partnership, provided that the other partners are insolvent. Before taking a partner, the business owner should employ him and learn his ability.

An important advantage of incorporating a business is that a corporation never is liable for any act of an employee not within the scope of the employment, or for contracts not within the scope of the business as defined by the corporation's charter, and not authorized by the directors. Moreover, any person who transacts business with a corporation is bound to know that the official or employee who assumes to represent the company is legally authorized to bind the corporation: otherwise, the corporation is not liable. On the other hand, no member of a partnership may avoid liability for debts pertaining to the business which were contracted or authorized by any other partner. A partner may remain liable even after he sells the business, or any interest therein.

Patent Liability

This question was recently submitted: "Is an inventor subject to a suit if he marks his invention 'Patent Pending' or 'Patent Applied For' after he knows that he cannot get a patent?"

There is no legal liability when an inventor who has filed an application for a patent marks his inventions and advertising matter "Patent Applied For" or "Patent Pending." The terms "Patent Pending" and "Patent Applied For" mean that the inventor filed an application for a patent, but the patent is not yet granted. On the other hand, the penalty for falsely marking articles "Patented" is a fine of $100 for each offense, with other stipulations. However, the law does not prescribe a penalty for use or misuse of the terms "Patent Applied For" or "Patent Pending." These terms have been adopted by inventors without legal authority, al-

Cement Mixer Takes 60° Grade, one of many Four Wheel Drive tests. In all these grueling tests, Cities Service Lubricants make the grade and then some! They've done it for 20 years.

Early Four Wheel Drive Truck is one of vehicles in firm's museum. Founded in 1910, the company's first production amounted to 12 vehicles. Today, it is thousands yearly.

Toughest trucks made— Toughest lubricants used!

Four Wheel Drive Auto Company has been Cities Service customer for 20 years!

If you think things are tough on the trucks at your construction job or quarry, you should visit the Four Wheel Drive plant at Clintonville, Wisconsin.

There you'd see famous Four Wheel Drive trucks going through tests tougher than they'll probably ever meet on your job or anyone else's.

Ditto for the Cities Service Lubricants that Four Wheel Drive uses.

For what could be tougher on a truck and its lubricants than grinding up a hill in loose sand . . . sinking axle deep in a mud bath . . . driving diagonally across a washboard test ground . . . and climbing a 60 degree grade of dirt or gravel?

Make no mistake, Cities Service Lubricants meet the test . . . and have for the past 20 years at Four Wheel Drive Auto Company.

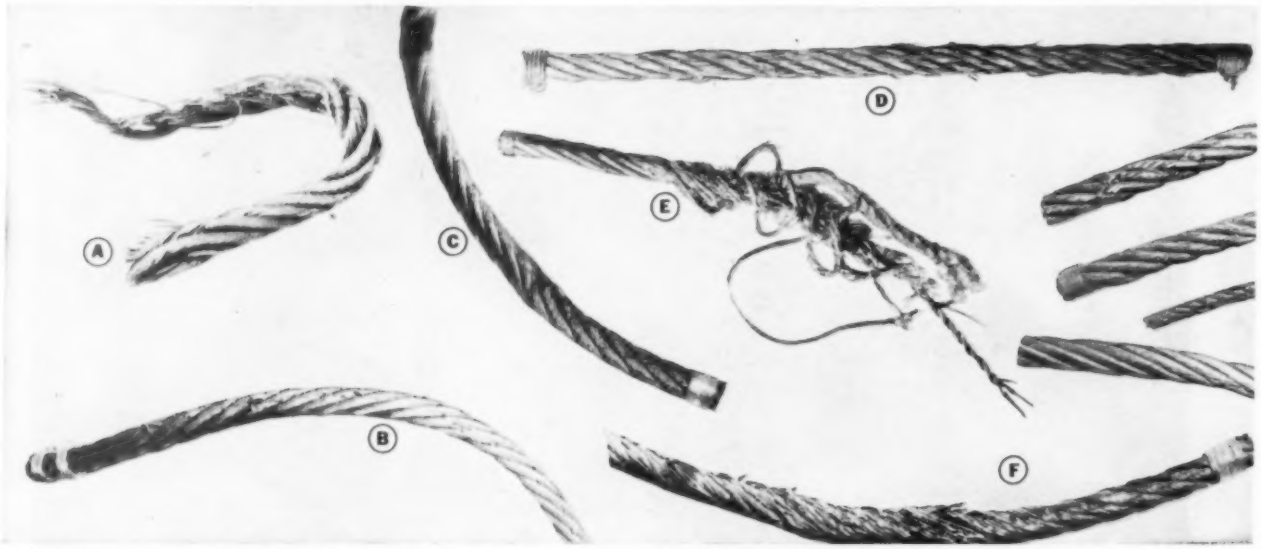
So it stands to reason that however tough the terrain and conditions on *your* job, Cities Service C Series Motor Oils and Trojan H Multi-Purpose Grease will more than make the grade . . . especially if you follow the expert recommendations of your Cities Service Lubrication Engineer.

For all the details, call the nearest Cities Service office, or write: Cities Service Oil Company, Sixty Wall Tower, New York 5, New York.

CITIES SERVICE

QUALITY PETROLEUM PRODUCTS

Tuffy Wire Rope Tips



Tuffy gives you a quick run-down here on some of the mortal enemies of wire rope — the abuses that quickly ruin rope efficiency or end its life abruptly long before you have had the service you paid for.

Even the best wire rope is a sitting duck for the enemies which won against the wire rope pictured on these pages. When you avoid or eliminate them you make important gains in longer rope life, better service and greater economy. Remember, your Tuffy distributor will be glad to work with you against these and other wire rope hazards.

It's the "end of the line" for wire rope when these things happen:

A. Mangled in a wedge socket. Here's the result of improper socketing. This fatal rope injury was caused by a poorly designed or worn out wedge socket. Failure at the dead end can damage other sections of the rope.

B. Rusty road to ruin. Rust — No. 1 enemy of steel — takes a heavy toll in wire rope life. It's an insidious, silent type of killer, often doing irreparable damage before it's even noticed. The one-strand break shown above resulted when the rope was allowed to become rust-bound through lack of lubrication. With other conditions ideal, tests show properly lubricated rope has up to 10 times the life expectancy of dry rope.

C. The crushing blow. The Sunday punch for this piece of wire rope was delivered by a tractor cleat — just one of many crushing injuries that result when wire rope is run over or banged into by a hard, sharp object. Even the best rope is no match for this kind of mistreatment.

D. Strangled by misfit sheaves. When the bearing surface of a

Tuffy Special Wire Ropes are tailored to special use. Ordering is easy:

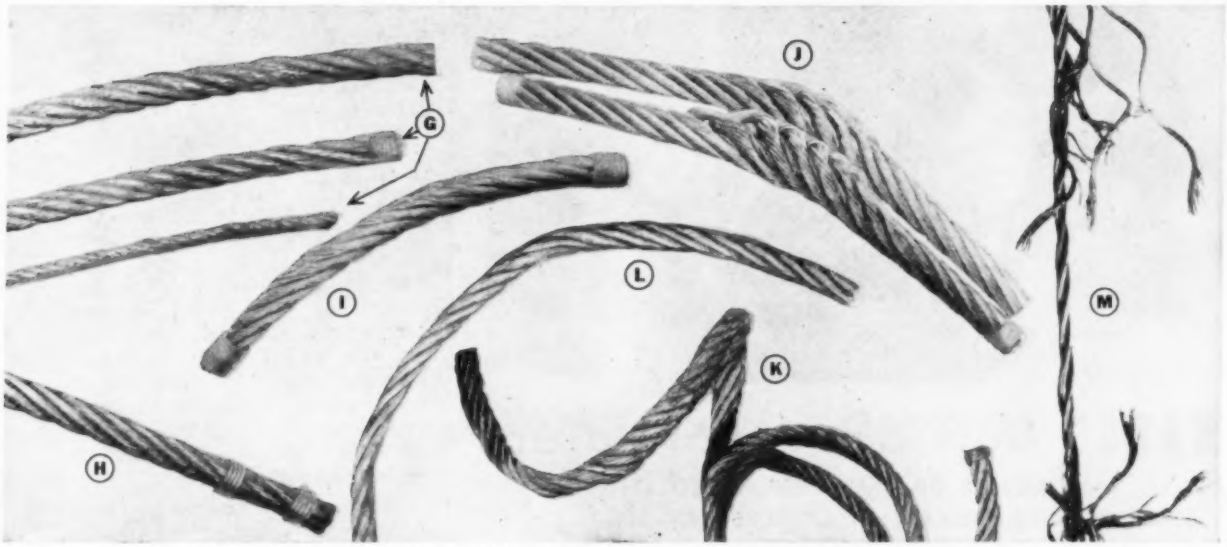
Tuffy Scraper Rope

Moves more yardage per foot because **Tuffy** Scraper Rope is specially built to take the beating of extreme drum-crushing abuse. Flexible; withstands sharp bending; hugs sheave grooves and winds snugly and smoothly on drums. High resistance to load shock on slack line.

Tuffy Dragline Rope

A longer-wearing line for all dragline operations. Special abrasion resisting construction which also gives extra flexibility. Tuffy Draglines also spool better, ride better on grooves and hold tightly to drums when casting. Consistently dependable in handling any material – wet or dry dirt, sand, gravel, rock, cement or minerals.

How wire rope is crippled and killed without a fighting chance



sheave is too small for the rope diameter, pinching action quickly destroys the rope especially when it is overloaded. The one shown above was knocked out in just 1½ hours of service.

E. Apparent suicide! This rope jumped out of sheave and was soon destroyed by pulling around the shaft. Actually it was a case of sudden slack which threw the rope out of the sheave.

F. This rope came to an untimely end by operating over a sheave that did not turn. Note the exceptionally heavy abrasion on one side of the rope.

G. Victim of "the bends." Excessive bending soon wears out rope. Generally, more flexible ropes are used as bending stresses increase (with decrease in tread diameter of sheave or drum). If a rope is operated on a sheave too small for its bending characteristics, early failure is certain. Through an exhaustive series of bending tests, Union engineers have compiled data that you can use to be sure you get the rope construction that will give you the longest service life. Ask about it.

H. On the "blink" from a kink. This open kink resulted from mishandling of wire rope. Guard against kinks by proper winding on the drum. Never pull a loop smaller; always enlarge it, then straighten out the rope.

Crushed and worn from "beatings on the drum." Drum wear gives wire rope severe punishment even under normal operating conditions. This wear is found at the cross-over points and at the flange. Excessive drum crushing results from operating on too large or too small a drum. Here are typical "drum beatings":

I. Cross-over wear

J. Cross-over crushing on drum

K. Drum-crushing on oversized drum

L. Drum-crushing on undersized drum

Although drum wear cannot be eliminated, its effects can be greatly reduced. Under properly engineered procedures, two and three times the service can be obtained from the same line. Union Wire Rope engineers will help you with this problem. Get in touch with us for more information.

M. Overloaded — soon exploded. Wire rope is "prescribed" for a given use on the basis of breaking strength plus a safety factor of 4. The grade of steel, type of construction and size of the rope determine tensile strength. It must be properly related to the loads it will carry, or expensive and dangerous early failures are likely to occur.

Just say **Tuffy** give length and size, and forget complicated specifications.

Tuffy Slings and Hoist Lines

Here's a team that cuts hoisting and down time costs in all types of materials handling.

Tuffy Slings are made of a patented, 9-part machine-braided fabric that stays extra flexible, and isn't materially damaged by knotting or kinking.

Tuffy Hoist Line is a special construction with the extra flexibility and toughness for longer service life on overhead cranes, derricks and clamshells.

Tuffy Dozer Rope

Long after ordinary ropes are worn out, **Tuffy** Dozer Rope has the stamina it takes to keep on handling the blade. 150' reels mounted on your dozers let you cut off worn sections without wasting good rope. This unbeatable combination piles up sizeable savings on dozer rope costs.

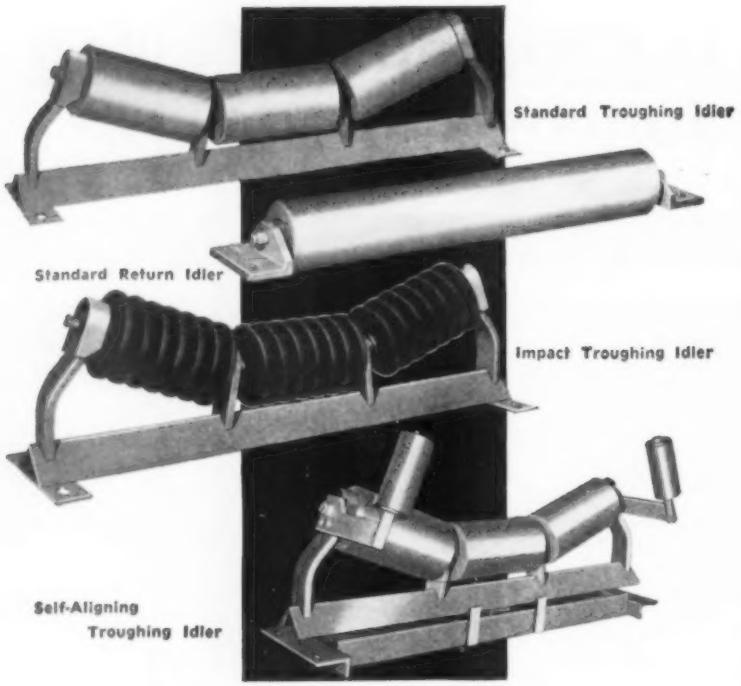
Your **Tuffy** distributor will help check your equipment

Condition of equipment is a big factor in longer rope life and greater economy. Your Tuffy distributor will help you check equipment and operating conditions to make sure everything is in your favor for getting the greatest service out of your Union wire rope. Ask him to lend a hand in a thorough inspection. He'll be glad to do it. And if there are still knotty problems, Union Wire Rope Corporation engineering department will help further.

union Wire Rope **corp.**

2132 Manchester Avenue, Kansas City 26, Mo.

Specialists in high carbon wire, wire rope, braided wire fabric, stress relieved wire and strand



MARCO belt conveyor idlers

INCREASE PROFITS BY HANDLING GREATER LOADS AT LOWEST COSTS...

The advanced engineering ideas incorporated in MARCO conveyor idlers will increase your production and lower your material handling costs.

For example, MARCO idlers have greater load capacity because they are designed with precision ground ball bearings, designed specifically for conveyor idlers. At 300 revolutions per minute, they will carry loads up to 860 lbs. per bearing. These anti-friction bearings give you added years of idler service life and lower power requirements.

Less maintenance: Pre-lubricated, effectively sealed bearings eliminate field lubrication. Self-shedding base keeps material build-up at a minimum. End and center brackets are ½" thick steel, die formed, to eliminate breakage.

Why settle for anything less than the proven economy and efficiency offered by MARCO idlers? Units fit any conveyor frame and are available in many types and sizes. **Ask for bulletin ID-2.**

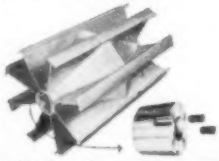
MARCO — One source for all your Conveyor Needs

Whether you need a complete conveyor, or any conveyor accessory, there is a MARCO product to meet your exact requirements. By relying on MARCO —you save time, trouble and get more for your dollar.

Get the facts from your MARCO distributor or contact E. F. Marsh Engineering Co., St. Louis 10, Mo.

Solid Steel Pulleys
(all-steel, heavy-duty)

All MARCO pulleys offer the outstanding advantages of machined faces and Taper-Lock bushings—at a competitive price.



Self-Cleaning (wing-type) Conveyor Pulleys
(Steel fabricated, jig welded)

Pulley pays for itself many times in longer belt life by discharging 'mis-located' particles before belt can be damaged.

MARCO*

*Trademark Reg.

engineered MARCO products:
Tubular Frame Belt Conveyors—Conveyor Idlers—Solid Steel and Self-Cleaning Steel Pulleys—Bucket Elevators—Control Gates—Feeders—Bins.

though their proper use is considered by higher courts as being lawful.

No person can be held liable for infringement of an invention marked or stamped "Patent Applied For" or "Patent Pending" because no one is liable for infringement until after the patent is granted and issued.

Only One Blast Necessary

According to a late higher court decision, if the owner of property damaged by blasting proves only one damaging blast, he may recover adequate damages.

For example, in *Dalton v. Demos Brothers General Contractors*, 135, N. E. (2d) 646, the testimony showed that a contractor made at least 25 blasts, continuing regularly through June, July, August, September, and October, during the construction of a trench. Homes nearby were damaged. The property owners sued the contractor and proved that only one blast was of sufficient force to cause the damages. The higher court held the contractor liable in damages for injuries to the homes, and said:

"In the present case the jury were furnished with enough evidence of the specific damage caused by the single negligent blast to enable them, with their knowledge of practical affairs, to measure its probable extent. We think that the evidence as to the physical damage caused by the negligent blast, compared to that caused by the rest of the blasting was sufficient to enable the jury to determine with reasonable accuracy the proportion of the expense of restoration which should properly be assessed against the defendant."

Employer Furnished Transportation

A late higher court held that an employer is never protected against an injured employee suing for damages when the injury is sustained within the scope of the employee's employment. Last month a higher court laid down this important law: An employer who agrees to transport an employee to his place of work, or other place, owes a non-delegable duty to furnish the employee reasonably safe transportation and exercise "ordinary care" to protect him from injury during the transportation. The employer is liable to the employee for injuries caused by failure to exercise "ordinary care" to safeguard the em-

ployee against injuries.

For illustration, in *Montgomery Company v. Furlong*, 219 Fed. (2d) 726, the testimony showed facts as follows: One day an employee named Furlong had his automobile in the repair shop. The same day his employer made arrangements with one Martin to take Furlong to figure a job.

Pursuant to the arrangement, Furlong and Martin left in Martin's pickup truck. While rounding a curve in the highway at a speed of about 50 m.p.h., the right front wheel of the truck left the paved portion of the highway. The vehicle traveled approximately 30 to 40 ft. with the right front wheel off the pavement on the shoulder. In attempting to turn the truck back onto the pavement, Martin lost control and collided with an oncoming car, causing an accident which resulted in severe physical injuries to Furlong. As a result of such injuries Furlong was confined at hospitals for over four months.

In subsequent litigation, the lower court held Furlong entitled to recover $32,000 damages from his employer. The higher court approved this verdict.

Restrictive Contract

A reader made this request: "Please suggest a form of contract which will prevent an employee from learning how we conduct our business and then taking employment with a competitor. Recently some employees we trained quit and went to work for a competitor, and we want to stop this."

For illustration, in *Eigelbach v. Boone*, 287 S. W. 225, it was shown that a contract between an employer and his employee contained this important clause: "I agree that, in the event my employment is terminated for any reason, I will not injure or attempt to injure your business or the business of your clients or associated interests by communicating with or otherwise getting in touch with your customers, directly or indirectly, in any way, form, or manner; but, on the other hand, by my conduct and action, I will at all times do all I can to make friends for you. I further agree that, in the event of termination of my employment for any reason, I will not engage in the same or similar line of business in the same city, either for myself or another person, firm, or corporation, for the period of one year immedi-

WORKERS RELY ON CROSBY CLIPS

Rigging a cable way 600 feet in the air demands the best fittings available to protect men and materials. This crew is assured of maximum safety because their work platform is secured with genuine Crosby* Clips. This clip, quickly identified by the "Red U-Bolt*" is the number one choice on every job where maximum safety and holding power is essential. Look for the red U-bolt—you'll see it securing wire rope in every industry! And Crosby is the *only clip* available in sizes to fit every rope from ⅛" to 3"! Proved design and quality controlled manufacture—finest steel, drop forged base, galvanized—results in consistently reliable performance.

THIMBLES INCREASE ROPE LIFE, SAFETY

Unless protected by a thimble, wire rope can be seriously damaged by heavy lifts that crush the strands at the load point. A light thimble can collapse and damage the rope. For positive rope protection and safety, specify Crosby Laughlin heavy plow steel thimbles with the extra heavy steel section design that stands up under maximum loads. Plow Steel Thimbles are available in sizes to fit ¼" to 2¼" wire rope. Stainless Steel Thimbles are offered in selected sizes.

From one source, Crosby Laughlin Lebus, you get the world's most complete line of fittings: Crosby Clips and "Load Rated" Blocks; Crosby-Laughlin drop forged shackles, hooks, Missing Links*, turnbuckles, thimbles, and other fittings; famous drop forged Lebus Loadbinders and drop forged Snatchblocks! Your Crosby Laughlin Lebus Distributor is your one stop fittings supplier—see him next time you need *any* fittings!

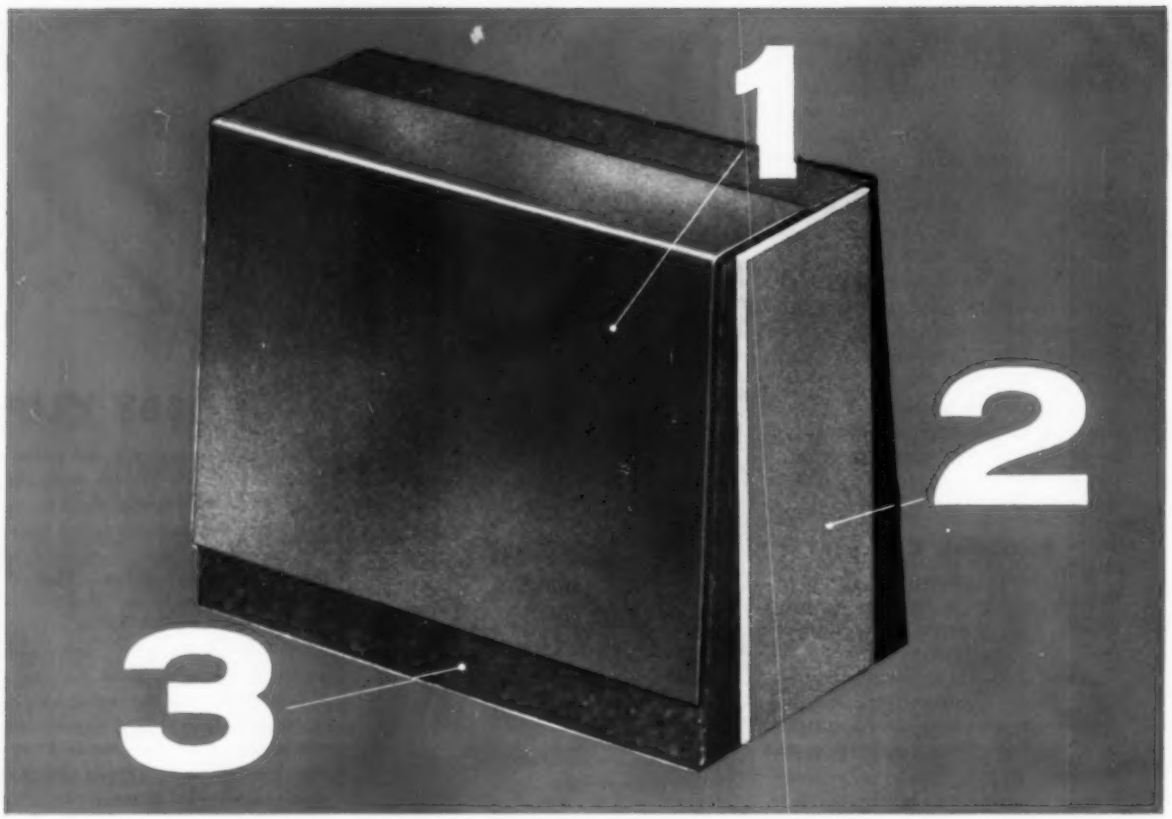
*REGISTERED TRADEMARK

World's Most Complete Line of Fittings For Wire Rope and Chain

CROSBY LAUGHLIN LEBUS

FORT WAYNE 1, INDIANA

KAISER UNITAB*



THESE KAISER-ENGINEERED FEATURES MAKE UNITAB YOUR BEST KILN LINER INVESTMENT . . .

1 Pre-formed steel shim bonded to liner with special adhesive.

- Bonding assures automatic placement of shim between each brick in ring.
- Thickness of combustible adhesive provides correct allowance for circumferential expansion (within ring).
- Radius formed by shim bend provides "V" opening between liners; this "V" serves as a pilot for wedging shims needed to lock ring.
- Shim overlapping hot face makes visual inspection easy—to see that each brick is correctly installed.
- When kiln is fired hot face overlap melts, oxidizes and combines with the feed to speed build-up of coating.
- Half-inch gap between end of shim and shell acts as heat buffer to conserve fuel.

2 Cardboard spacer attached to one end of liner.

- Combustible spacer automatically provides correct allowance for longitudinal expansion (between rings).
- Factory-bonded accessories, both shims and cardboard spacers, simplify handling for installing crew . . . save up to 50% installation time . . . simplify ordering and inventory.

3 Performance-proved Kaiser Periclase-Chrome basic brick.

- The same brick that has been giving cement producers amazing improvements in hot zone service.
- Unequalled for dimensional accuracy and uniformity.
- Outstanding volume stability under loading.
- Excellent resistance to chemical attack by cement clinker at high temperatures.
- High spall resistance—takes and holds coating even through shutdowns.

*Patent applied for—U.S.A., Canada and Mexico.

*(Kaiser Unitab was formerly known as "Unitized Kiln Liner T3")

KILN LINER...

Industry's first **kiln liner with bonded shim and spacer... introduces** *savings up to 50%* **on installation time... makes correct brick placement** *automatic* **... provides foolproof allowances for expansion! Kaiser Unitab liners give you** *all this plus* **superior dimensional uniformity and the unsurpassed hot zone performance of** *Periclase-Chrome* **basic brick...** *pioneered and proved by...*

Call or write Kaiser Chemicals Division, Department C-72x41 Kaiser Aluminum & Chemical Sales, Inc., at any of the regional offices listed below:

PITTSBURGH 22, PA. . . . . . **3 Gateway Center**
HAMMOND, IND. . . . . . **518 Calumet Building**
OAKLAND 12, CALIF. . . . . . **1924 Broadway**

Kaiser Chemicals

Pioneers in Modern Basic Refractories

Refractory Brick and Ramming Materials • Castables and Mortars • Magnesite • Periclase • Deadburned Dolomite

Now! A MAMMOTH for mining and quarrying

You can look to the Autocar AP-40 to provide a new way to profitable volume hauling. From face to breaker and back again, there's nothing to match its fast trip cycle. Under heavy, crunching loads and over a variety of grades, it provides extraordinary low-gear performance—and high-gear speeds between 25 and 33 mph. Its weight to horsepower ratio is 275:1—never before achieved in a heavy-duty truck.

AUTOCAR rated 40 tons

The strength of this powerful unit rests solidly on the tough torque-resistant box frame of 1-in. plate with corrugated internal reinforcement of ¾-in. plate. Seven cross members. Depth of frame under load area, 23½ in.; length, 27 ft. 11½ in., weight 16,800 lb.

AUTOCAR TRUCKS

Autocar Division, The White Motor Company
Exton, Pa.

Autocar

The AP-40 has a **single drive line** for simplicity of construction, economy of operation, and easy maintenance.

ONE **mighty 600 hp engine**
rugged transmission
heavy-duty straight-line driveshaft

Here are a few of the massive features of the AP-40

Engine

V-12 turbocharged Diesel developing 600 hp, which means a weight to horsepower ratio never before obtained in heavy-duty trucks.

Transmission

A brand-new transmission, with 9 speeds forward and 2 reverse, specifically designed to handle the power of the 600-hp engine. This is the first vehicle built with this transmission.

Clutch

17-inch 2-plate clutch, manually actuated with air assist for ease of clutch pedal operation.

Clutch facing: Ceramic-metallic.

Axles

Tandem rear axles with planetary gears located at the outer end of the wheels for easy accessibility. Forward rear axle has a double reduction carrier. Rear rear axle has a single reduction carrier with a matching ratio. Interaxle differential is of the 4-pinion, high traction type capable of transferring increased torque with the greatest possible traction.

Body

27-cu.-yd. heavy rock body with chute construction, exhaust heated. Full cab protector.

Hoist

Double acting, outboard mounted, telescopic type. Supports integral with frame. 70° dumping angle.

White Autocar

ately following the termination of my employment to you."

Soon after signing this contract the employee terminated his employment and immediately became engaged in a competitive business. The employer filed suit, asking the court to issue an order to prevent the employee from violating the terms of the contract. The court promptly granted an injunction against the ex-employee engaging in the competitive business.

If, however, the contract between the company and employee contains a provision whereby the employee agrees not to engage himself with a competitor or in a competitive business under penalty of paying a stipulated amount of money, then the employee is privileged to pay the company the specified amount, and he may without further liability hire himself to a competitor or engage himself in a competing business. (289 S. W. 295) In other words, a company cannot obtain an order from a court restraining an ex-employee from engaging in a competing business and also compel him to pay a pecuniary penalty.

Must Prove Allegations

Recently a higher court held that an employee who alleges that he is entitled to additional wages must clearly prove his allegations; otherwise, he is not entitled to a recovery.

For illustration, in *State Stone Company v. Walker,* 294 S. W. (2d) 931, the testimony showed that an employee, named Walker, worked on a public road project. He sued the State Stone Company to recover wages due on the ground that he was entitled to a wage scale established for firemen. Further testimony showed that Walker was employed by the State Stone Company, Inc. as a "fireman" and that under state regulations fixing wage scales on such projects, he was entitled to the scale established for "firemen."

The higher court refused to allow Walker $1,250 alleged overdue wages, and said that there was no evidence that plaintiff (Walker) was entitled to receive wages as a "fireman" under the state regulation.

Employee Takes Risk

One reader asked this question in a letter: "Can a contractor sue a property owner and recover damages for an injury sustained by reason of dangerous conditions on the property?"

Recently a higher court laid down this law: A person who enters an uncompleted building takes the risk of using the premises in the condition in which he finds them. This rule is applicable not only to the interior of the building, but to the immediately surrounding area with respect to conditions caused by presence of materials which are deposited thereon in the course of construction.

For instance, in *Allen v. Jim Ruby Construction Company,* 291 Pac. (2d) 991, it was shown that a contractor dug a hole on private property owned by one Willis. The employee of another contractor fell into the opening and received injuries.

In subsequent litigation the jury awarded the injured employee $6,000. The higher court reversed the verdict, saying:

"Where a person goes upon the premises of another without invitation and simply as a bare licensee, and the owner of the property passively acquiesces in his coming, if an injury is sustained by reason of a mere defect in the premises, the owner is not liable for negligence, for such person has taken all the risk upon himself."

Thoroughbreds
for your string!

SPANG

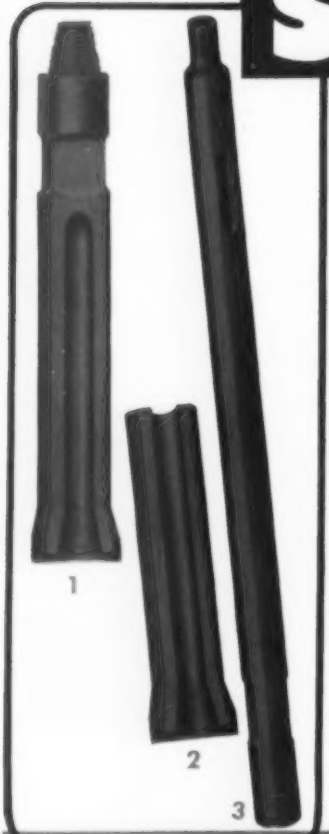
BLAST HOLE
BITS and
STEMS

Sure winners in performance and production! Spang Bits and Stems, developed by skilled experts, are a safe bet to pace the field in long service and economy. Win, place or show you can be sure with Spang.

① SPANG CHURN DRILL BITS drill more holes per bit at lower cost! Fully heat-treated, high carbon, molloy steel, or 4340 steel. They have added strength in pin and blade sections to enable them to take the toughest drilling conditions in stride. Semi-dressed ends speed finish-dressing.

② SPANG REPLACEMENT BLADE SECTIONS are for welding to the pin and collar sections of the original bit when it has become worn from long service.

③ SPANG INTEGRAL ROPE SOCKET TYPE STEMS with heat treated swivel socket and swivel. Drill more . . . drill longer for less with these rugged, efficient stems. Made from one bar of steel with only a threaded box joint with integral rope socket top the stem's uniformity cuts vibration or whipping. Tools turn freely in the open swivel socket keeping the hole round and straight.



Your inquiries are welcome— contact your nearest Spang dealer or write direct to:

The HIGHER STANDARD

SPANG & COMPANY

DEPT. M-3 BUTLER, PENNSYLVANIA

For over 60 years Manufacturers of Spang Weldless Jars and a Complete Line of Cable System Drilling and Fishing Tools for Oil and Gas Wells, Prospect Drilling and Shot Blast Holes.

NEW, 2-YD LOADER steps up efficiency of this operation

TRACTOMOTIVE TL-20D TRACTO-LOADER® Takes Over The Ore Loading Job — Releases Clamshell For Other Duties. Speeds Other Loading and Stockpiling in Rock Quarry for Basic Refractories., Inc., Fostoria, Ohio.

TL-20D LOADS 13 TONS OF HEAVY PHILIPPINE ORE IN 3 PASSES (material used in manufacture of brick). A rail-type clamshell was tied down full-time to this part-time job. Now the clamshell is used on other work . . . and the versatile TL-20D easily handles the ore loading, among its other jobs.

ON STOCKPILING, the TL-20D carries over 7,000 lb of limestone every trip up a steep incline. Delivers full loads because the TIP-BACK bucket retains the loads. Stockpile is several hundred feet long, about 40-ft wide and nearly 40-ft high.

PLEASED WITH PERFORMANCE

Both the superintendent and operator are pleased with the stability and power of the TL-20D . . . the ease with which the hydraulic torque converter drive gets heaped loads . . . the speed and simplicity of one lever control of all speeds, forward and reverse — exclusive with Tractomotive. Operator shifts into and out of any gear, at will, "on the fly."

TRACTO — a sure sign of modern design

SOLD AND SERVICED BY YOUR ALLIS-CHALMERS CONSTRUCTION MACHINERY DEALER

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Deerfield, Illinois

☐ Please send TL-20D Literature
☐ Have salesman call

Name .....
Title .....
Company .....
Address .....
City ..... State .....

NEW . . .
IMPROVED . . .
dustex collector
. . . solves more recovery problems
and assures peak efficiency

NOW, a major design improvement on the widely used and highly regarded DUSTEX Collector means bigger returns on your investment.

ALL NEW TUBE DESIGN — Longer, larger *cast* tube produces the following results . . .

- Greater capacity with less air flow resistance
- Higher abrasion resistance
- Ability to handle inherently sticky materials
- Self-cleaning action
- Highest efficiency ever

ALREADY PROVEN in numerous field tests on the most difficult dusts, the new improved DUSTEX Collector is ready to go to work for you now. Write for descriptive literature and details today.

P. O. BOX 2520 dustex CORP. BUFFALO 25, N. Y.

FOR THE CONTROL OF ROCK, ORES, ETC.
TO CRUSHERS, CONVEYORS, ETC.

ROSS CHAIN FEEDERS
ROSS DROP-BAR GRIZZLY FEEDERS

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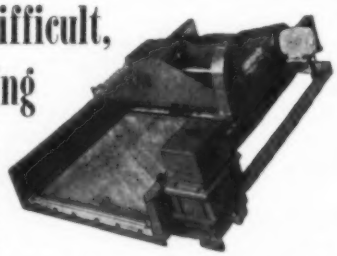
Higher Efficiency for Difficult, Fine Mesh Screening

Materials requiring fine mesh screening, particularly those that are damp or sticky such as lime, ag-lime and silica sand, are screened most efficiently by the Leahy® No-Blind® Vibrating Screen with FlexElex® heating. The great superiority of this screen stems from the fact that its Flex-Elex jacket heating is not an attachment, but is fully integrated for highest thermal and electrical efficiency. Send for Bulletin 16-EH.



Made by the Original Deister Company Established 1906

THE DEISTER CONCENTRATOR COMPANY
911 Glasgow Avenue, Fort Wayne, Indiana

Obituaries

FRANK M. LEGATE, founder of the Jacksonville Sand Company, Jacksonville, Fla., died on May 26 at the age of 72. Mr. LeGate retired in 1955.

AGOSTINO CARLONI, 68, founder and head of the Corlett Sand & Gravel Company, Cleveland, Ohio, died recently in Warrensville Heights, Ohio.

ROBERT NEIL COWHAM, a director of the General Portland Cement Company, Chicago, Ill., died recently at the age of 66.

JOHN W. PETERS, founder of the John W. Peters Sand and Gravel Company, Burlington, Wis., died in a local hospital at the age of 71.

BERNARD PRATT BOGY, 90, cofounder of the Missouri Portland Cement Company, died recently in Firmin Desloge Hospital, St. Louis, Mo. He was a director of the company from 1900 until his retirement from the board in June, 1951.

RICHARD E. GAVIN, 87, former head of the Buffalo Slag Co., Buffalo, N. Y., died at his home in that city. He began his career with the old Lake Shore Railroad. When the railroad was absorbed by the New York Central, he formed the Buffalo Slag Company.

DANIEL J. BOYLAN, president of the Boston Sand and Gravel Company, Boston, Mass., died recently in that city at the age of 73 years.

ERNEST C. J. HALLER, treasurer of the Coplay Cement Company, died in Allentown, Pa., at the age of 55. Mr Haller had been associated with Coplay for the last 35 years, and was company treasurer for 25 years.

WARREN F. DROLLINGER, 33, owner of Spokane Sand and Gravel Company Spokane, Wash., and general manager of Acme Concrete Company, was killed on April 10 when pinned beneath a crawler-type tractor which had overturned. The accident occurred in the gravel company's pit.

One of the B-80 dumpers operated by Morse Sand & Gravel Company, Inc., of Attleboro, Mass.

two gravel-hauling dumpers supply 20 ready-mix trucks

"Our two Mack dumpers operate nine hours a day supplying gravel for our fleet of 20 ready-mix trucks. Averaging six round trips an hour over our own roads, these Macks have hauled over 350,000 tons in the last six months. Continuous operation of these two dumpers is vital to us. That's why we chose Macks . . . and they've more than lived up to their reputation. So far, we've had only routine maintenance and service to contend with." This is the experience of Mr. Alfred H. Morse, president of Morse Sand & Gravel.

Macks are universally acknowledged for their outstanding performance, operating economy and stamina. On-the-job operating reports, like Mr. Morse's, show why.

Want more proof? Let your Mack representative show you the performance records of other Mack users in your area—operators who found out how much they can profit by using the best. Mack Trucks, Inc., Plainfield, New Jersey. In Canada: Mack Trucks of Canada, Ltd.

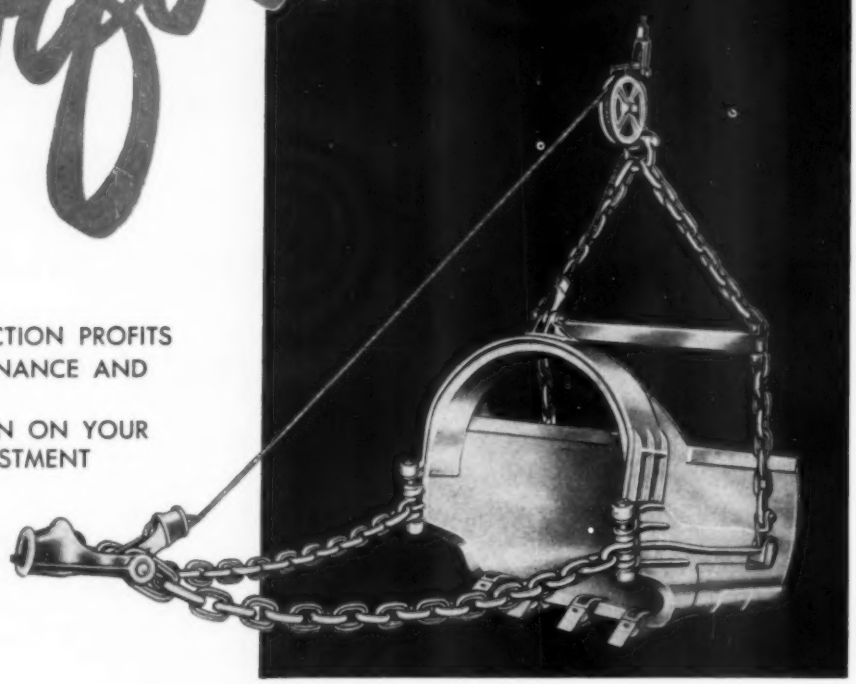
MACK
first name for
TRUCKS

Perforated or Solid...

HENDRIX
DRAGLINE BUCKETS

set
new
standards
of...

Performance



- TOPS IN PRODUCTION PROFITS
- LOW IN MAINTENANCE AND SERVICE COSTS
- A BIGGER RETURN ON YOUR EQUIPMENT INVESTMENT

Hendrix Lightweight DRAGLINE BUCKETS

A TYPE FOR EVERY DIGGING PURPOSE—¼ to 40 Cubic Yards

HENDRIX MANUFACTURING COMPANY, Inc.

MANSFIELD, LOUISIANA

"finest loader on rubber . . ."

"It's the fastest machine we ever had on the job or have seen on any other job," says R. H. Parsons, President of Aggregate Limestone Co., producers of limestone products near Birmingham, Alabama. "We like its capacity, especially the full roll-back bucket action that means more production, cleaner material and cleaner work area. I consider my HO 'PAYLOADER' the finest loader on rubber."

No one knows better than a man with Mr. Parsons' years of experience how to judge the performance of tractor-shovels. His plant produces 8 sizes of stone for use in general construction, road building, concrete, asphalt mix, and fluxing stone for steel processing. Better than 90% of this production is stockpiled and loaded out by HO "PAYLOADER" units.

You, too, will find that among rubber-tired tractor-shovels, none can match the versatility, mobility and productive capacity of the three new 4-wheel-drive "PAYLOADER" units. More reliable traction, greater digging power and faster, easier operation are some of the "PAYLOADER" advantages that appeal to operators who know tractor-shovels best. There are more "PAYLOADER" units in use today than all other models combined and your "PAY-LOADER" Distributor wants to demonstrate the "finest loader on rubber" on your work. Why not call him today?

YOU GET MORE FROM A "PAYLOADER" BECAUSE:

MORE SPEED . . .
power-shift transmission makes all shifts under full engine speed . . . no stopping, no clutching.

MORE TRACTION . . .
exclusive power-transfer differentials automatically deliver more power to wheels with best footing.

MORE DIGGING POWER . . .
40° roll-back of bucket at ground level and tremendous pry-out action get heaped loads quickly and easily.

LESS SPILLAGE . . .
hydraulic load-shock-absorber smooths the ride, permits faster load carrying speeds.

PAYLOADER®
MANUFACTURED BY
THE FRANK G. HOUGH CO. LIBERTYVILLE, ILL.
SUBSIDIARY—INTERNATIONAL HARVESTER COMPANY

THE FRANK G. HOUGH CO.
750 Sunnyside Ave., Libertyville, Ill.

Send data on 4-wheel-drive "PAYLOADER" tractor-shovels as checked:

- ☐ HO (1 to 4 cu. yd. buckets)
- ☐ HH ⅞ to 3¼ cu. yd. buckets)
- ☐ HU (⅝ to 2⅛ cu. yd. buckets)

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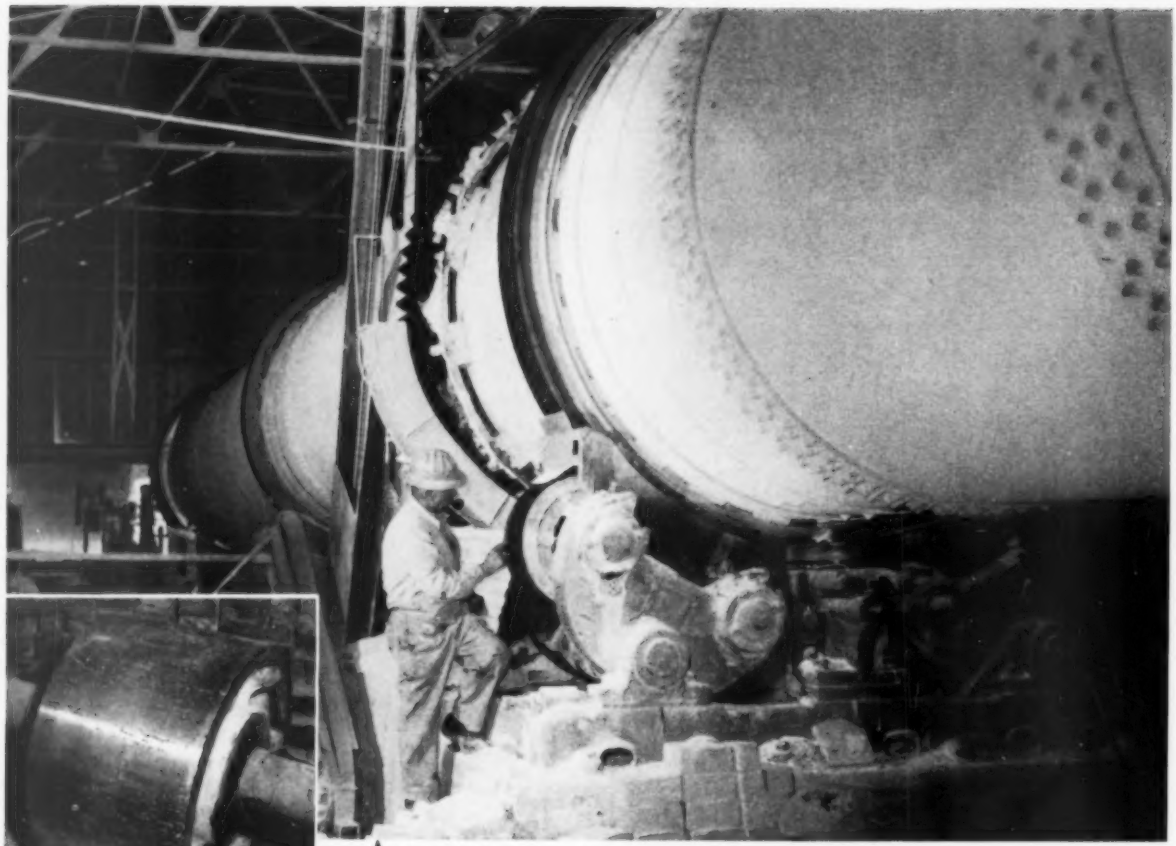
84



View showing relative size and position of furnace, rolls and rings.

Roll hardfaced with Victoralloy No. 1. After ten months of constant operation, no wear, flaking, or cracking of edges.

A case of wear and tear... and how Victoralloy solved it

PROBLEM:

The 300-ton furnace of Diamond Springs Lime Company, Diamond Springs, Calif., rolls on 16 centered 30/40 carbon steel rolls. The furnace's heavy weight and terrific heat caused the rolls to flake and crack at the edges. This in turn caused the furnace roller-rings to begin disintegrating. How to stop the wear and tear before an expensive shutdown and complete replacement of rolls and roller-rings became necessary?

SOLUTION:

Herbert Green, superintendent, and John Desson, general foreman, hardfaced the rolls with Victoralloy No. 1 Coated-Electric. Checking after ten months of operation, they found the case solved: no flaking of rolls, no cracking at the edges, and no disintegration of furnace roller-rings.

You, too, can solve cases of wear and tear on operating parts with Victor hardfacing alloys. Complete line of 26 different alloy rods assure you a right rod for every hardfacing need. Full range of sizes for both acetylene and electric AC and DC applications, either hand or automatic. Order from your Victor dealer TODAY.

• FREE •
Victor Hardfacing Manual shows you right rod to use and how to apply it. Write us NOW *for your copy.*

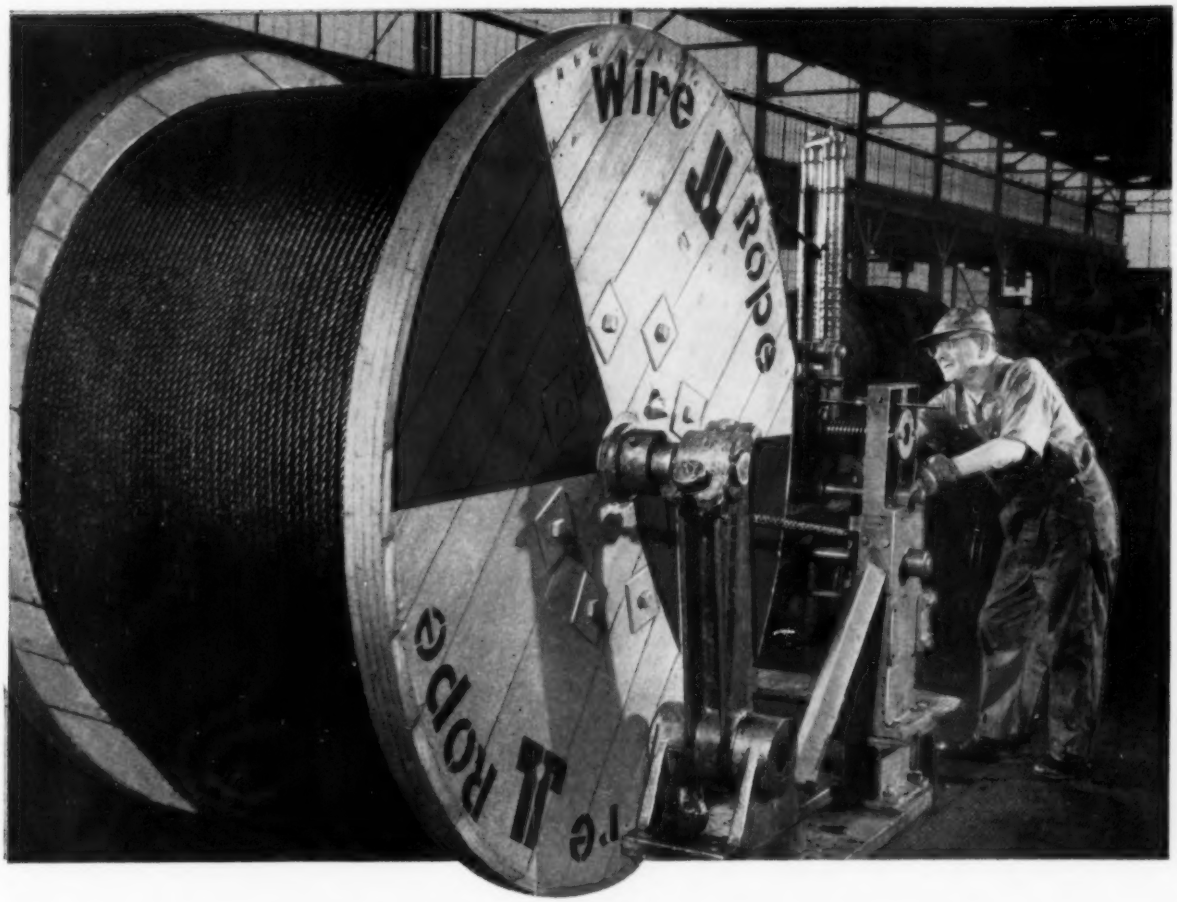
Profitable dealerships open; inquire now!

VICTOR for hardfacing

H-40 **VICTOR EQUIPMENT COMPANY**

ALLOY ROD AND METAL DIVISION

13808 E. Imperial Highway, Norwalk, Calif. • Wakita, Oklahoma



J&L CENTERFIT WIRE ROPE

toughest combination of strength and flexibility ever designed

On jobs where shock, severe bending and extreme loading are a problem, CenterFit wire rope gives you extra service life.

CenterFit is your best wire rope for back hoe pull ropes, shovel hoist ropes and clamshell holding and closing lines where overloading may occur. Here's why:

- CenterFit is the strongest standard wire rope produced
- More external and internal bearing surface
- Greater flexibility
- Extra metallic area of the cross section with more equal stress distribution among the strands

CenterFit's longer service life means less down time, lower operating costs. Send coupon today for complete information.

Jones & Laughlin Steel Corporation
Wire Rope Division
Muncy, Pennsylvania

☐ Please send literature on CENTERFIT wire rope.
☐ Have representative call.

Name_____

Title_____

Company_____

City_____ Zone____ State____

Jones & Laughlin
STEEL ...a great name in steel

AT HOME IN THE ROUGH

NAYLOR PIPE is as Distinctive in Performance as it is in Appearance

Don't let the light weight of Naylor pipe fool you. Built into its light wall is an exclusive spiral lock that gives this pipe extra strength and safety not found in other pipe of the same wall thickness.

This means that you can rely on Naylor pipe to do the job no matter how rough the going. Suspend it. Support it. Bury it or install it on the surface. It's at home in any setting, always ready to handle air, water, tailings, hydraulicking—and similar service in mining operations.

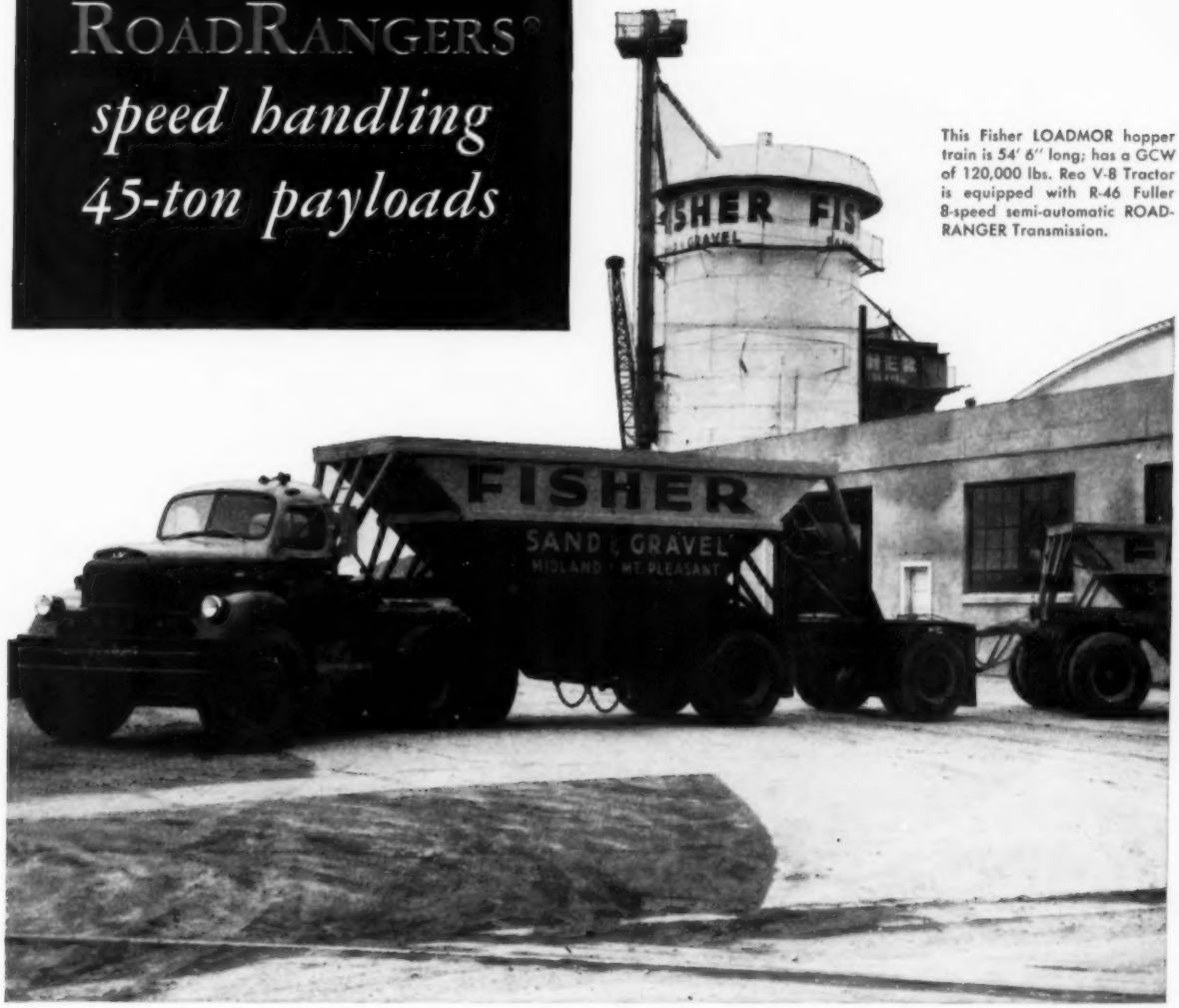
Remember—along with this outstanding performance, Naylor pipe gives you savings in time, work and material. That's why it will pay you to get the complete story. Just write for Bulletin No. 507.

NAYLOR

NAYLOR PIPE COMPANY
1257 East 92nd Street, Chicago 19, Illinois

Eastern U.S. and Foreign Sales Office:
350 Madison Ave., New York 17, New York

ROADRANGERS speed handling 45-ton payloads



This Fisher LOADMOR hopper train is 54' 6" long; has a GCW of 120,000 lbs. Reo V-8 Tractor is equipped with R-46 Fuller 8-speed semi-automatic ROAD-RANGER Transmission.

Where maximum payloads run up to 45 tons, Fisher Sand & Gravel uses 2 Reo Tractors equipped with 8-speed R-46 Fuller ROADRANGER Transmissions pulling double-bottom trains.

Says Bill Fisher, President: "The Reo V-8, together with the 8-speed Fuller ROADRANGER Transmission, give us ideal performance. The R-46 ROADRANGER is particularly suited to our operation because of the short length of the transmission, the even steps between gear ratios, and the lighter weight as compared to main transmission and an auxiliary or 2-speed axle. The faster shifts and the short even steps between gear ratios are a big advantage because of the high GCW on adverse grades. Each of the Reos has accumulated 70,000 miles of trouble free service."

Fisher Manufacturing, Inc. of Mt. Pleasant, Michigan, builds the double-capacity super-haul trailers used by Fisher Sand & Gravel Company, Midland . . . and markets them to other aggregate hauling firms as well.

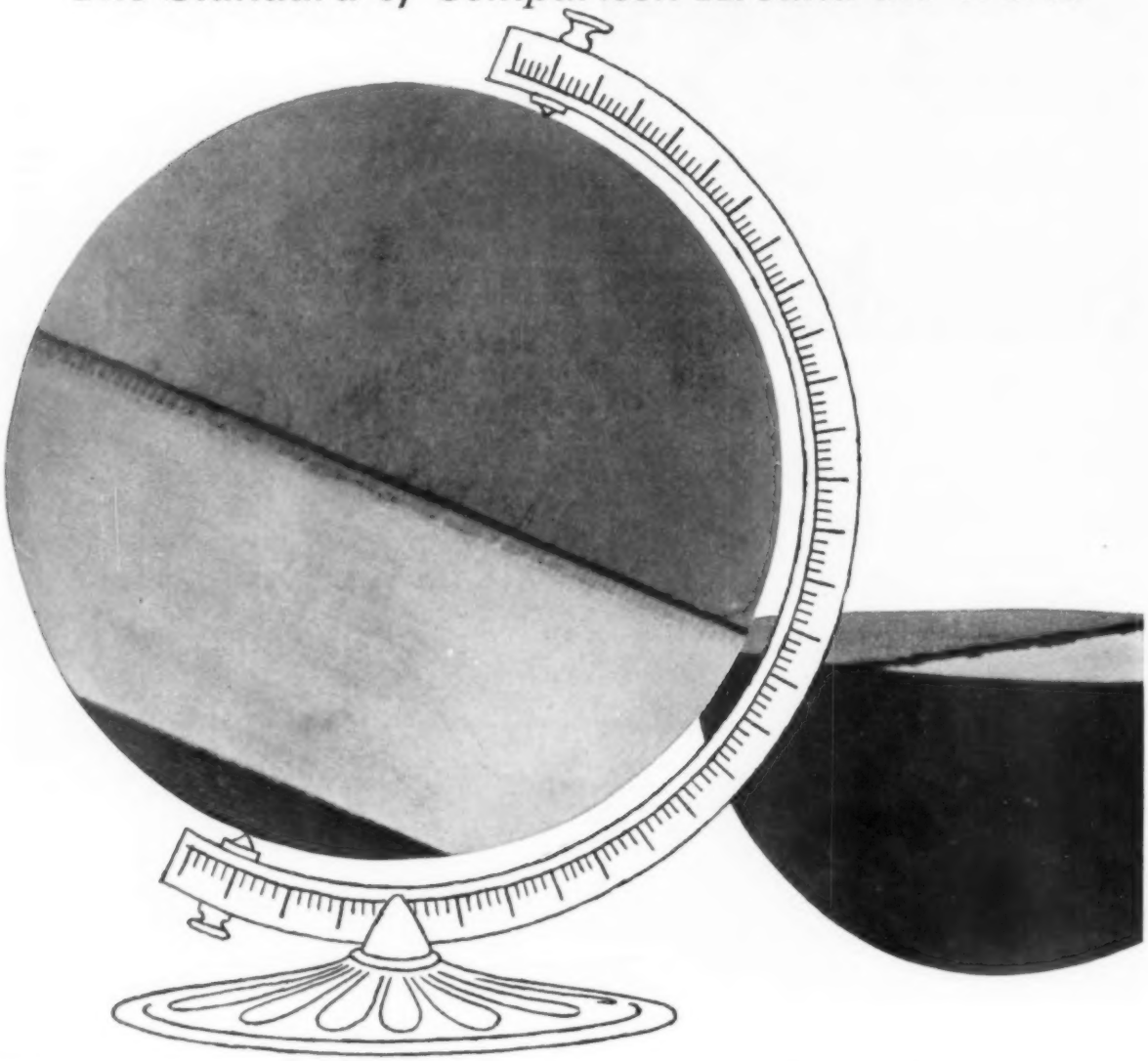
Does your application call for an easy-shifting, shorter, lighter-weight, higher capacity transmission . . . with short even steps between ratios to keep engine rpm in the maximum hp range? Check with your truck manufacturer or dealer for the right Fuller ROADRANGER for your job, or write Fuller Manufacturing Company (Transmission Division) Kalamazoo, Michigan.

FULLER

TRANSMISSIONS

Unit Drop Forge Division, Milwaukee 1, Wisconsin • Shuler Axle Company, Louisville, Kentucky (Subsidiary) • Sales & Service, All Products, Western District Branch, Oakland 6, California and Southwest District Office, Tulsa 3, Oklahoma.

The Standard of Comparison Around the World



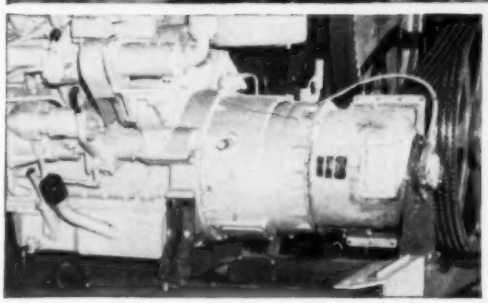
hard and tough to the core...

Moly-Cop Grinding Balls have earned a reputation for long, economical service in the major mills of the world...and for good reason. The alloying, forging and heat treating by Sheffield assures an unvarying hardness and toughness to the core.

SHEFFIELD
ARMCO®
MOLY-COP
COPPER-MOLYBDENUM-ALLOY
Grinding Balls

SHEFFIELD DIVISION ARMCO STEEL CORPORATION SHEFFIELD PLANTS: HOUSTON • KANSAS CITY • TULSA
EXPORT REPRESENTATIVES: THE ARMCO INTERNATIONAL CORPORATION, MIDDLETOWN, OHIO

Equipped with a Twin Disc Torque Converter, this 2½-yd. Lorain L-85 Shovel is working on heavy highway grading near New Stanton, Pennsylvania, for Lycoming Construction Co., Williamsport.



Inset (left) is a Cat D337 Diesel Engine-Twin Disc Torque Converter combination which is available in the Lorain L-85.

How torque converters *assure* higher dividends from your major equipment investments

Twin Disc Torque Converters, dependably and efficiently transmitting power to your heavy-duty machinery, *assure you a higher return* on your equipment investment, through *more work done in less time* . . . with a *minimum of maintenance and costly downtime.*

Here are five profitable, proved reasons why Twin Disc Torque Converters help you to earn *more* from your other equipment investments . . . such as the Lorain L-85 Shovel pictured above.

1. The torque-converter eliminates lugging and stalling . . . permitting engines to work in the maximum efficiency range *all* the time, delivering *constant* high-horsepower output—getting more work done.

2. Experience has proved that *smooth* converter power reduces peak loads throughout the shovel drive train because fluid within the converter absorbs much of the impact energy resulting from a quick drum speed change . . . thus protecting *both* driving and driven equipment.

3. When necessary, the torque converter smoothly delivers approximately twice normal torque to the drum, which, at slow digging speed, represents an important advantage in power delivered to the dipper.

4. Cable life is extended since no sharp impact loads ever reach cables through the torque converter. Constant line tension is maintained . . . there is no jerking or snapping.

5. An infinite variety of ratios is available to work with, permitting smooth, accurate control of loads and delicate "inching" or "holding" under power.

Specify a torque converter in *your* next new machine, or when you repower. And investigate the advantages of Twin Disc Torque Converters—both single-stage *and* three-stage—for most other heavy-duty applications from 30 to 1000 hp.

For details, request Bulletin 508 and 135-E (single-stage and three-stage respectively.)

TWIN DISC

TWIN DISC
Torque Converters

TWIN DISC CLUTCH COMPANY, Racine, Wisconsin (Hydraulic Division), Rockford, Illinois

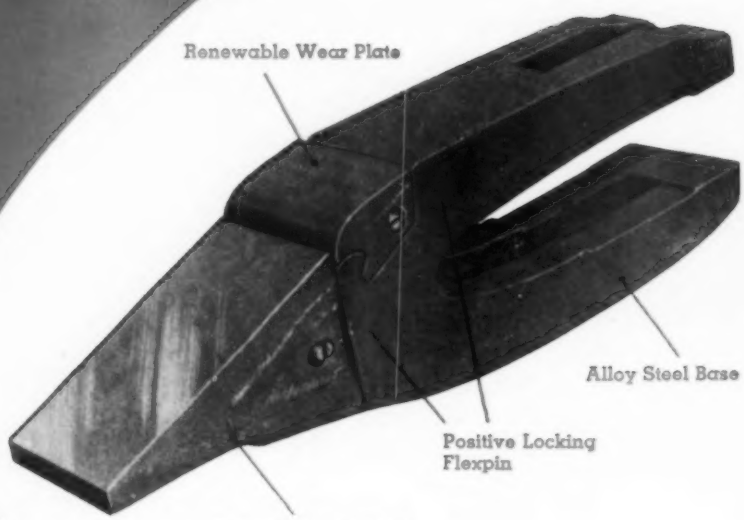
H&L

Take advantage of

EXPERIENCE specializing exclusively in the manufacture of

Teeth that really dig

There is no substitute for FORGED ALLOY STEEL



Whistler type shanks for 8 or 10 yd. shovels with renewable wear plate and forged tooth point. Both wear plate and point securely attached with H & L flexpin.

ALL H & L POINTS ARE MADE OF ROLLED HIGH ALLOY STEEL (NOT CAST)

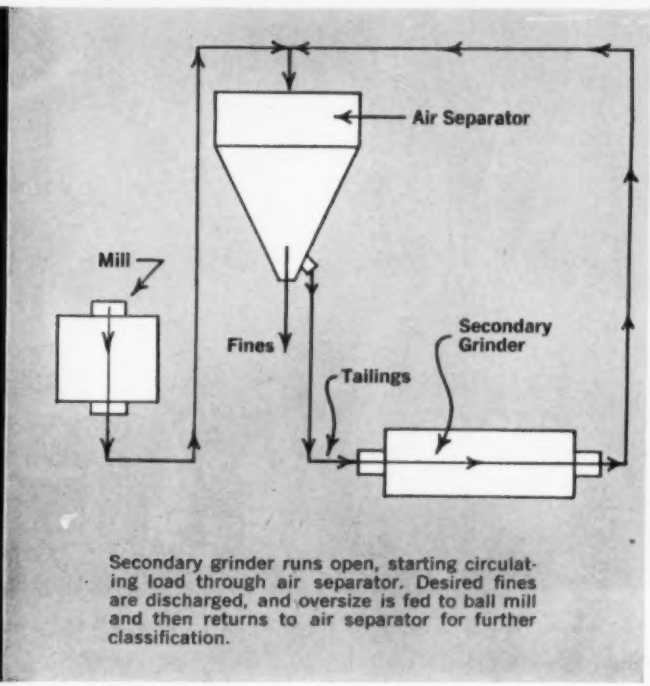
The majority of bases and adapters are also made of rolled high alloy steel.

H&L TOOTH COMPANY

1540 SOUTH GREENWOOD AVE. MONTEBELLO, CALIFORNIA

Stop Overworking Grinding Mills

FEED SPOUT
Sturtevant Air Separators come in 9 models, diameters range from 3 to 18 ft.
TAILINGS DISCHARGE
FINES DISCHARGE



Secondary grinder runs open, starting circulating load through air separator. Desired fines are discharged, and oversize is fed to ball mill and then returns to air separator for further classification.

LET STURTEVANT AIR SEPARATION HELP YOUR SYSTEM PRODUCE UP TO 300% MORE 40 TO 400 MESH FINES — CUT POWER COSTS AS MUCH AS 50%

Fines that pass through grinding mills unhindered, serving only to increase the work load, can be quickly classified by a Sturtevant Air Separator operating in closed circuit. With all oversize automatically returned for further grinding, the result is production capacity impossible to achieve in single-pass grinding — as well as a better, more uniform product.

Closed circuit grinding and air separation is of proved advantage in *all* secondary reduction processes. Grinding mills are free to perform at top efficiency, their output frequently increased as much as 300% and power costs cut up to 50% (documented by 30 years of Sturtevant air separation experience in the cement industry). Further, attritional heat is dissipated by greater surface exposure.

Sturtevant Air Separators Keep Grinding Units At Peak Efficiency — Classify Feed Loads to 800 Tons Per Hour

Sturtevant Air Separators circulate production loads with exact control of air currents and centrifugal force. Simple adjustments make possible counter-action between the two to the point where a product of almost any desired fineness may be collected while coarser sizes are rejected.

A 16 ft. Sturtevant, for example, took a feed rate of 800 tph, containing only a small percentage of desired fines, and delivered 30 tph 90% 200 mesh, recirculating the oversize through the grinding circuit. (In the cement industry, Sturtevant units deliver up to 60 tph raw cement fines, 40 tph finished cement fines.)

Sturtevant's ability to engineer precise, high capacity classification for closed circuit grinding systems is the result of long experience with a wide variety of dry processes. Sturtevant designed its first air separator some 40 years ago — and has been pioneering developments in centrifugal classification ever since.

Current users of Sturtevant Air Separators include manufacturers of sulfur, soybeans, phosphate, chocolate, feldspar, sand, pigments, limestone fillers, abrasives, plasters, ceramics and cement.

Designed for precise separation of all granular materials, Sturtevant Air Separators have been adapted to other materials as well. Johns Manville, for example, uses a 10 ft. model to separate 3 to 6% undesirable rock from asbestos.

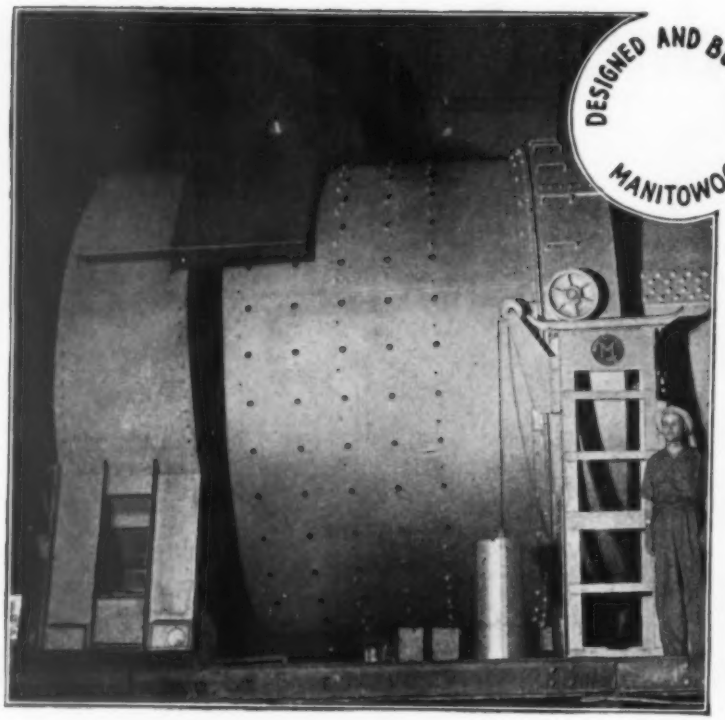
Ruggedly constructed, Sturtevant units are designed for minimum maintenance — at a Midwestern rock-crushing plant, a 10 ft. Separator operates outdoors year-round with only routine care.

For further information, request Sturtevant Bulletin No. 087. Write Sturtevant Mill Co., 104 Clayton St., Boston 22, Mass.

STURTEVANT

Dry Processing Equipment

CRUSHERS • GRINDERS • MICRON-GRINDERS
SEPARATORS • BLENDERS • GRANULATORS
CONVEYORS • ELEVATORS



MANITOWOC developments to reduce production costs

Manitowoc Type S Recuperator applied to Unit Fired Rotary Cement Kiln 11 ft. x 400 ft.

***MANITOWOC** Recuperator for rotary kilns insures immediate quenching and maximum heat recovery.*

***MANITOWOC** Slurry Agitator provides thorough agitation and blending with minimum power and air consumption.*

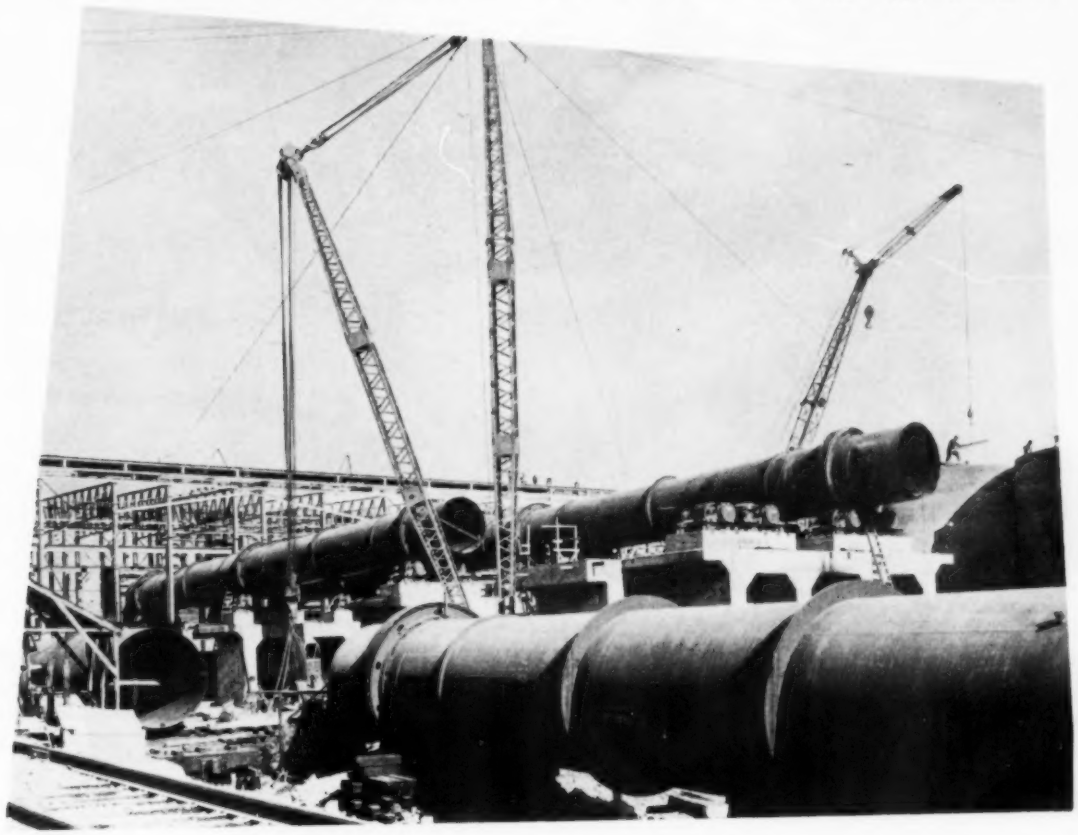
The wide acceptance of the Manitowoc Recuperator in the United States has led to important installations in South America, Australia and the Philippines.

The demand for units of high capacity has resulted in our Type S design suited to kilns of maximum output. In all cases the Recuperator may be readily attached to an existing kiln, requiring the minimum of labor in erection, involving no foundations or brickwork and occupying minimum floor space.

MANITOWOC SHIPBUILDING, INC.

General Offices and Plant, Manitowoc, Wisconsin

. . . BUILDING THESE TAKES *BACKGROUND*



When you build a new plant, enlarge, rebuild, or modernize an existing plant, TAKE IT UP WITH

The Portland cement industry has been served for many years by the complete design and construction facilities of Stearns-Roger. Every step including engineering, fabrication and field erection is handled with the skill of qualified engineers working from long experience.

For a smooth-running cement plant, give the complete assignment to Stearns-Roger.

Stearns-Roger

THE STEARNS ROGER MFG. CO. • DENVER, COLORADO

DENVER • HOUSTON
EL PASO • SALT LAKE CITY
STEARNS-ROGER ENGINEERING COMPANY, LTD., CALGARY

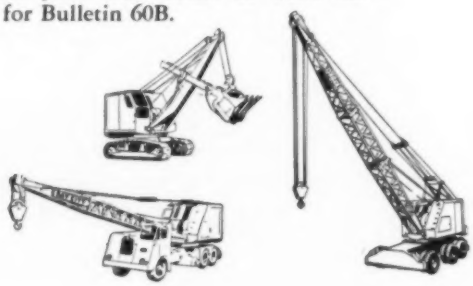
- DESIGN
- ENGINEERING
- FABRICATION
- PROCUREMENT
- CONSTRUCTION

MORE POWER ~~TO~~ *for* YOU!

How the EXTRA POWER in the NEW BAY CITY ONE YARD SHOVEL HELPS YOU

260

The *greater power* and greater strength built into the new heavy-duty BAY CITY one yard-shovel results in smoother, faster operation for you. There's *greater power in the engine:* a big 113 H.P. Diesel assures you of the ability to get in and out of tough places, to dig hard materials with ease, and to maintain a fast, smooth digging cycle. *Power steering* through cone clutches which actuate brakes, gives you superior maneuverability: you can make sharp or gradual turns in either direction while the machine is in full motion . . . you don't have to stop to throw out jaw clutches or set steering brakes. *Power Boom Hoist* on the BAY CITY raises and lowers boom always under power, and the *Power Dipper Trip* makes dumping much easier and much faster. In addition, the BAY CITY has *Power Booster Clutches* which take fatigue out of operating and give you bigger yardage. Put this powerful BAY CITY to work. Get further information today, from your local dealer or write the factory for Bulletin 60B.



BAY CITY SHOVELS INC. • BAY CITY, MICHIGAN

BAY CITY

SHOVELS • CRANES • HOES • DRAGLINES • CLAMSHELLS

LOADS 2 CU. YDS. PER PASS

quicker...easier...
at less cost per yd.

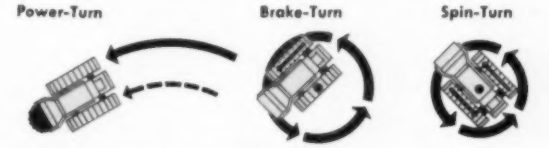
For big yardage production, no other crawler in its class can match the combination of power, speed and maneuverability you get with the new *2 cu. yd.* Case® TerraTrac® Model 1000 tractor-shovel. It not only gets bigger loads faster . . . it also turns and maneuvers faster with a new *COUNTER-ROTATING* Terramatic transmission that drives one track *forward* and the other track *reverse* at the same time.

Exclusive "Knock-out" dumping action cleans bucket instantly of stickiest material, while extra-high (9'6") clearance lets you back away from big trucks or hoppers without stopping to raise bucket. You also get *exclusive torsion-bar track suspension, automatic track roller lubrication,* PLUS many other advanced features that will increase your production, cut your costs.

See this revolutionary higher-speed 2 cu. yd. rig now at your Case Industrial Dealer's, or mail coupon for catalog and free eye-opening demonstration.

100 HP Diesel plus torque-converter drive

Develops up to 24,000 lbs. of "crowding-power" for digging hard materials. Converter automatically balances tractor speed to changing loads . . . eliminates clutching and gear-shift guesswork . . . keeps engine and hydraulic pump operating with maximum power at all times.



Instant power-shift with 3-way power-steer

Enables you to change speeds or directions "on-the-go", without stopping to shift gears. Easy-working hydraulic controls let you turn and maneuver full loads easier — with power and traction on both tracks.

CASE INDUSTRIAL®

1st in quality
for over 100 years

Clip . . . mail for free catalog

J. I. CASE CO., Dept. G 1147 Racine, Wis., U.S.A.

☐ Send catalog on new 2 cu. yd. tractor-shovel
☐ I'd like a free demonstration on my job

Name ..... Position .....
Company .....
Address .....
City ..... State .....

CT-L-56

Industrial Wheel and Crawler Tractors • Loaders • Dozers • Backhoes • Engines

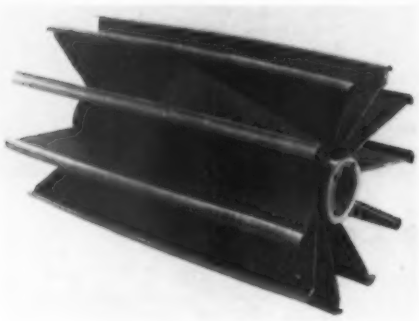
Manufacturers' News

Release of a new color-sound movie, titled *On the Move*, is announced by Baldwin-Lima-Hamilton Corp., Construction Equipment Division, Lima, Ohio. The 28-minute, 16 mm. film, which deals with the subject of transportation, points out the important role played by shovels, cranes, and other road building equipment in this important phase of civilization progress. Covered in the film is the gigantic St. Lawrence Seaway project, material handling, and general turnpike construction.

The movie is being distributed throughout the LIMA distributor organization. A limited number of copies are available for loaning to clubs, associations, and engineering and student groups. Scheduling is being handled by the BLH advertising department at Lima.

BELT SAVER PULLEYS
increase life of conveyor and elevator belts

VAN GORP BELT SAVER PULLEY



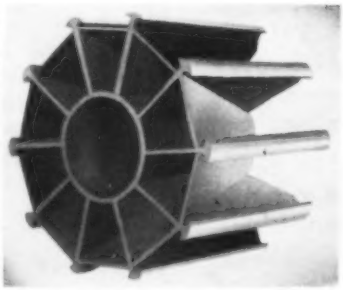
. . . built to "wallow" in the material without damage to the belt

THERE'S A LOT OF EXTRA MILEAGE in belts equipped with cost-cutting Belt Saver Pulleys.

These widely used units eliminate belt (abrasion and cord breakage). All welded steel construction combines light weight and high strength. Fins have half-oval crown faces—no sharp edges to cause belt wear and fatigue. Taperlock hubs and bushings for easy, fast, solid installation. Wing construction prevents building (up of moist or sticky) materials on belts and pulleys.

Sizes: (8″) to 60″ diameter, (8″) to 66″ face width. Special sizes on request. Standard crown face furnished unless otherwise specified. Other styles, including straight face, high crown, and straight face in center for bucket elevators supplied at no extra cost.

Write for Catalog No. P156 or contact local distributor.



CROSS SECTIONAL VIEW

VAN GORP WELDING & MFG. CO.
PELLA, IOWA

PAUL H. DAVEY SR., founder of the Davey Compressor Company, Kent, Ohio, and president of the firm since 1929, has been elected to the newly-created position of chairman of the board of both the Davey Compressor Company and Davey International, Inc. Davey International handles all Davey manufacturing and sales operations outside of the United States.

Mr. Davey Sr., credited with the invention of the first air cooled portable compressor, holds 55 patents in the compressed air and automotive fields, including the Davey heavy-duty power take-off used to power a wide variety of truck-mounted machinery.

P. H. Davey Sr.

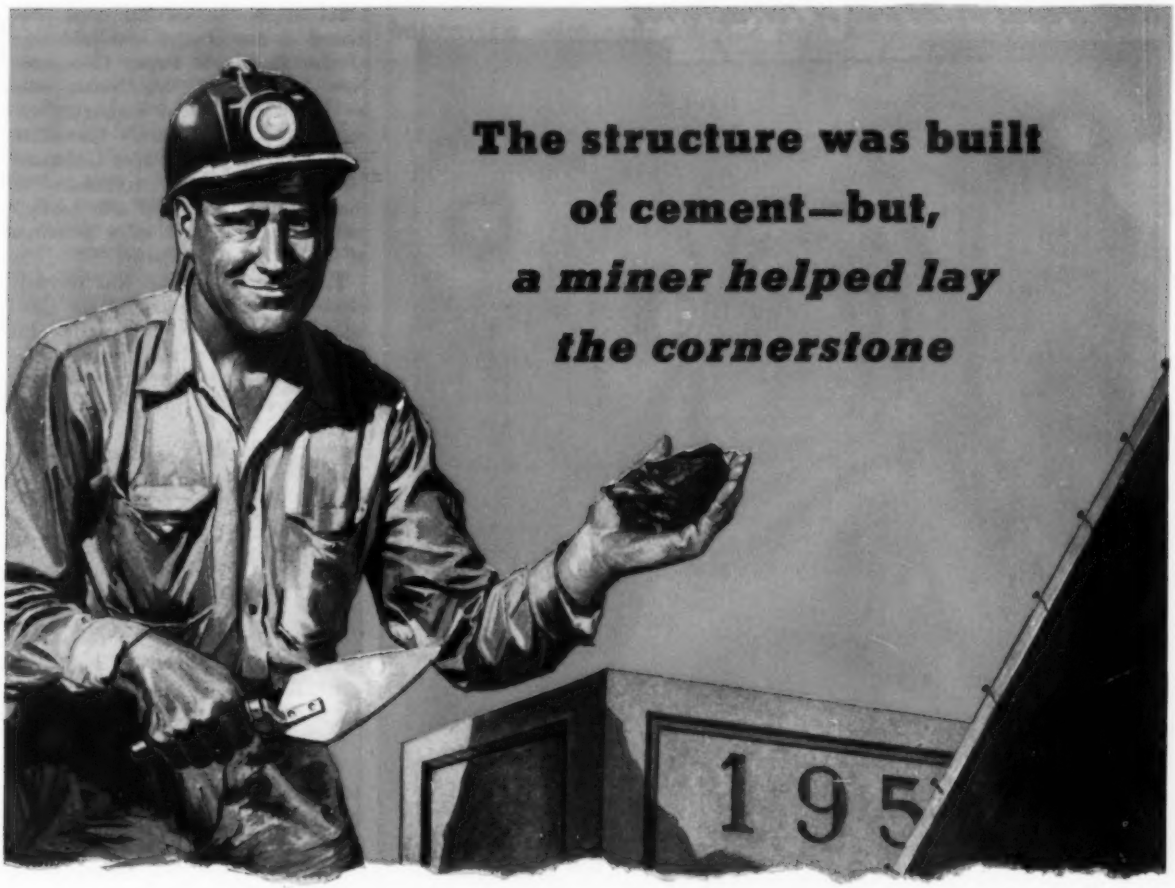
P. H. Davey Jr.

PAUL H. DAVEY JR., formerly vice-president in charge of production, succeeds his father as president of the firm. Mr. Davey Jr., who joined the organization in 1945, has had experience in virtually every department of the organization.

J. T. MYERS has been appointed president and treasurer of Davey International and general manager of Davey Compressor Co. Mr. Myers, who joined Davey in 1941, was previously vice-president in charge of sales. In his new position, he will be in charge of all Davey operations.

WILLIAM J. REDDINGTON has been appointed St. Louis district sales manager for the mechanical goods division of the United States Rubber Co., New York, N. Y. Mr. Reddington has been with U. S. Rubber since 1933.

In his new position, he will be responsible for the sale of mechanical goods products in Missouri, Arkansas, and sections of Illinois, Indiana, Kentucky, Mississippi, and Tennessee.

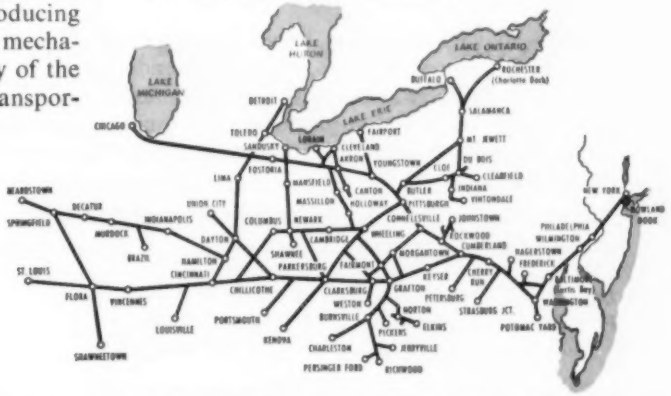


● Converting the raw building products provided by Nature into the rugged and beautiful works of man requires both vision and skill. It also requires *fuel*—the unseen factor behind every towering structure. Selecting the *right* fuel is important.

Along the Baltimore & Ohio are vast deposits of bituminous coal with structure and volatility ideal for producing cement, lime, and brick. Modern mechanization and the easy accessibility of the mines keeps production and transportation costs low. And because coal can be stored anywhere, the need for expensive facilities is eliminated.

We will be glad to advise you on the right kind of coal for your specific need, show you where to find it, and how to burn it. The modern efficiency, economy, and cleanliness of Bituminous will amaze you. *Ask our man!*

BITUMINOUS COALS
FOR EVERY PURPOSE



BALTIMORE & OHIO RAILROAD

Constantly *doing things*—better!

New trends in the use of refractories

For peak production switch to Laclede high alumina kiln liners

When your kilns operate day and night, long refractory service and little maintenance become critically important. Then the use of Laclede high alumina kiln liners gives you the satisfaction and dependability you need. They offer advantages of unusually low porosity, high strength, high density, high resistance to fluxing action of clinkers and possess high refractory values.

Laclede 70 (70% alumina) liners are made of high grade, selected Missouri diaspore, expertly blended with bauxite and bond clays. They contain materials and blending skill, plus quality control that produces only "quality-first" refractories. Laclede Peerlac (60% alumina) meets the same type of standards.

Prompt service is also a Laclede specialty. Call on your nearby Laclede representative soon.

Laclede-Christy Works, Refractories Division,
H. K. Porter Company, Inc., St. Louis 10, Mo.

HKP LACLEDE-CHRISTY WORKS
REFRACTORIES DIVISION
H. K. PORTER COMPANY, INC.

HUGH W. SLOAN has been promoted to the post of vice-president of the St. Regis Paper Company, New York, N. Y. Mr. Sloan, who is vice-president and managing director of the company's Canadian subsidiary, St. Regis Paper Company (Canada) Limited, continues in that capacity, and will also participate in the overall sales activities of the parent company.

L. R. Macrae, who was recently elected a vice-president of the Canadian subsidiary, is responsible for Canadian operations under Mr. Sloan's direction. Mr. Macrae's headquarters are in Montreal.

H. W. Sloan

J. Kludt

JONATHAN KLUDT has been elected executive vice-president and general manager of the Lincoln Engineering Company, division of The McNeil Machine & Engineering Company, Akron, Ohio.

Soon after joining Lincoln Engineering in 1934, Mr. Kludt became vice-president in charge of production. In April, 1956, when Lincoln merged with the McNeil organization, he was elected general manager of the Lincoln Division.

McNeil is an internationally known manufacturer of tire molding and rubber processing equipment. The Lincoln Division designs and manufactures lubrication equipment, serving all major industries.

E. HERBERT ROSE has been appointed chief beneficiation engineer in the Freyn department, Engineering & Construction Division, Koppers Co., Inc., Pittsburgh, Pa. He was formerly resident engineer for the Tennessee Coal & Iron Division of U. S. Steel Corp.

FRANK B. FALVEY has been appointed sales representative in New York for the American Manganese Steel Division, American Brake Shoe Company, New York, N. Y. Mr. Falvey joined the company in January, 1956.

The board of directors of the Lee Rubber & Tire Corp., Conshohocken, Penn., announces the election of ALBERT A. GARTHWAITE, JR., as president of the corporation. He succeeds his father, A. A. Garthwaite, who was elected chairman of the board, a post which in recent years has not been filled.

The new president, who is 40 years of age, was first employed with the Lee Corporation in the Engineering Department of the Republic Division. In 1945 he was named assistant to the vice-president in charge of plants and in 1949 was elected a director of the Lee Rubber & Tire Corp. In 1954 he became a vice-president and last year was named general manager of the tire plant facilities at Conshohocken.

RAYMOND E. BURTON, assistant sales manager for Koehring Division, has been appointed to the new post of assistant director of marketing for Koehring Co., Milwaukee, Wisc. His duties will cover both market research and analysis.

Mr. Burton started with the Koehring organization as a draftsman at the C. S. Johnson Co., Champaign, Ill. (a Koehring subsidiary), in 1948. In 1952 he transferred to Tokyo as Koehring representative for Ishikawajima-Koehring Ltd., producer of Koehring equipment for the Asian area. He returned to assume the sales position in July, 1955.

The merger of the Boston Woven Hose & Rubber Co., Cambridge, Mass., into the American Biltrite Rubber Co., Inc., Chelsea, Mass., has been announced by Maurice L. Bernstein, president of American Biltrite.

The activities of Boston Woven Hose are being carried on without interruption through a separate division of American Biltrite known as the Boston Woven Hose & Rubber Co. Division. The former officers of Boston Woven Hose continue as officers of this division.

Euclid Division, General Motors Corporation, Cleveland, Ohio, has appointed the Woods-McFarland Euclid Company, Birmingham, Ala., authorized dealer in Alabama.

Headed by Ernest H. Woods, president, the company will represent the complete line of *Euclid* earthmovers —scrapers, rear-dumps, bottom-dumps, and crawler tractors. A. L. McDonald, vice-president and general manager, will direct the firm's sales activities.

Improving wire rope service with **LESCHEN** HKP *Red-Strand*

This is the kind of super-duty job

——where Leschen Flattened Strand wire rope often outlasts others by 100% or more.

Your nearby Leschen man can give you all the facts—and service records to prove them. Your own records—after using Leschen Flattened Strand—may very well give you final proof.

Leschen Wire Rope Division,
H. K. Porter Company, Inc., St. Louis 12, Mo.

HKP LESCHEN WIRE ROPE DIVISION
H. K. PORTER COMPANY, INC.

Moves a million-ton mountain of coal a year!

One of the largest in the U. S., this system depends on over 7,000 feet of Quaker Rubber belting to keep the coal moving.

PROBLEM: The Detroit Edison Company needed three separate conveyor systems to carry coal into their River Rouge power plant: (1) dock to storage, (2) dock to breakers to plant, (3) storage to breakers to plant.

SOLUTION: Quaker engineers and the Quaker distributor's men, working with engineers of the power plant, suggested the use of a belting designed for high lifts and long center distances. Over 7,000 feet was installed.

RESULT: The three conveyor systems work smoothly and efficiently, carrying coal into the plant at the rate of one million tons a year.

YOUR PROBLEM: Whatever your conveyor needs, whatever your industry—there's a Quaker Rubber Belt (or Hose) of the *right* construction to handle the job safely and economically. Quaker engineering service is available for the asking.

To make sure 7,000 feet of Quaker Rubber conveyor belting (available in 48", 60" and 72" widths) was properly installed, splicing and vulcanizing of the belting was supervised by a Quaker Rubber specialist.

For your free brochure on conveyor belting, write your nearby Quaker Rubber distributor, or:

H. K. Porter Company, Inc.,
Quaker Rubber Works,
Philadelphia 24, Pa., or
Pioneer Works, Pittsburg, Calif.

HKP QUAKER RUBBER DIVISION
H. K. PORTER COMPANY, INC.

The Chase Bag Company, Chicago, Ill., has elected to its board of directors WILLIAM N. BROCK, FRANCIS H. LUDINGTON JR., and LELAND S. BROWN.

Mr. Brock, general sales manager of Chase Bag since 1953 and a vice-president since 1954, joined the firm in 1934 as a salesman. He was assigned to the Chicago and Grand Rapids territories, later becoming

W. N. Brock

F. H. Ludington Jr.

sales manager in Detroit and Toledo. In 1942 Mr. Brock was named manager of the Toledo manufacturing branch, and in 1945 he became assistant general sales manager in Chicago.

Mr. Ludington vice-president in charge of production and engineering, joined Chase Bag at New York in 1946, serving later as assistant manager of the firm's manufacturing branch located in Philadelphia. He became assistant vice-president for manufacturing in 1951 and was elected vice-president in 1954.

Mr. Brown, a vice-president of the First National City Bank of New York, is a specialist in corporate banking, and has been associated with the bank in many capacities since 1930. He is in charge of the bank's Forty-second and Madison Avenue branch.

The three new directors fill vacancies created by the retirement of J. G. Byam and K. L. Allen and the death last year of C. R. Decker Sr.

Dorr-Oliver Incorporated, Stamford, Conn., is constructing a $2,500,000 worldwide headquarters in Stamford. Located on an 18-acre landscaped tract, the new building will provide 120,000 sq. ft. of office space for the home office staff members of the worldwide engineering organization. The building will be ready for occupancy by May, 1958.

The new headquarters will house, in addition to top level executive and administrative staff, the finance, sales, advertising, company relations, and patent departments, and most of the company's technical divisions.

The Thew Shovel Company, Lorain, Ohio, is now manufacturing a complete line of rubber-tire front-end loaders, in addition to its line of power shovels and cranes. These loaders are identified and marketed as *Moto-Loaders*.

Production has begun in limited quantities on the 1¾ cu. yd. model. A ½-cu. yd. model is now available. Engineering progress is well along toward the development of additional models that will enable Thew to present a complete line of loaders in all the popular capacities.

Loaders will be merchandised under the direction of W. H. Madden. As loader sales manager, Mr. Madden will supervise a field and distributor organization which will be responsible for the introduction and distribution of these products.

The appointment of JAMES H. JOYNER as general manager of the Pioneer Works, Quaker Rubber Division, H. K. Porter Company, Philadelphia, Pa., was announced recently. Mr. Joyner's duties include the supervision of accounting, manufacturing, production, general plant operations, and sales.

Mr. Joyner joined Quaker as a salesman covering South Carolina and eastern Georgia in 1950. He has since set up Quaker branches in both St. Louis and Los Angeles. He spent two years as district manager in Los Angeles, supervising Quaker sales in a seven state area, prior to the purchase of Pioneer Rubber Mills by H. K. Porter Co. When Porter acquired Pioneer, Mr. Joyner was made manager of sales in the ten western states.

The election of T. F. FLOOD to the board of directors of The Fank G. Hough Company, Libertyville, Ill., has been announced. Mr. Flood, formerly vice-president, production, has been given the additional responsibilities of vice-president, sales and manufacturing.

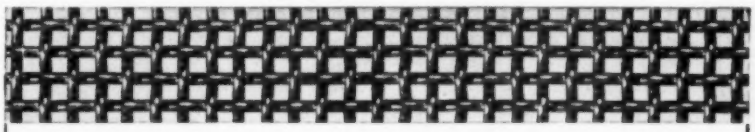
Mr. Flood came to The Frank G. Hough Co. in 1945 as a clerk in the production control department. He subsequently held the positions of yard stores supervisor, production control manager, production manager, and was made vice-president, production, in May, 1954.

The Dixon Supply Company, 425 S. 20th St., Birmingham, Ala., has been appointed by the Boston Woven Hose & Rubber Company, Boston, Mass., a distributor of *Boston* industrial rubber products.

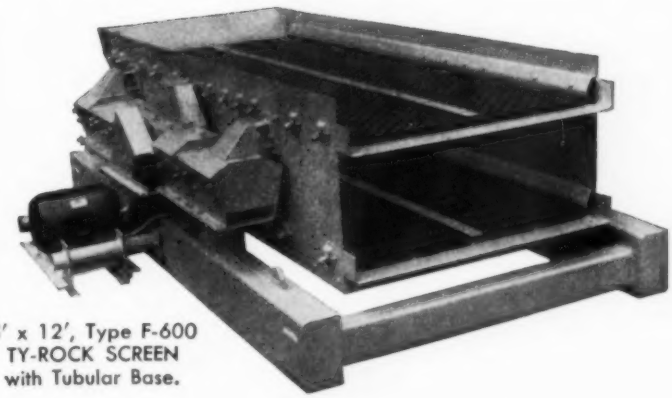
The appointment of HENRY DUFFY to the newly-created post of vice-president, manufacturing for the McDowell Company, Inc., Cleveland, Ohio, was announced recently. Mr. Duffy was formerly vice-president of the R. C. Mahon Company, Detroit, Mich.

In his new position, Mr. Duffy is responsible for the co-ordination of manufacturing activities of McDowell's seven affiliates. In addition to the Wellman Engineering Co., the group includes the Locomotive Crane, Dwight-Lloyd, and ABCs Scale divisions in Cleveland; the Williams Bucket Division, Akron; the Riverside Division, Martins Ferry, Ohio; and the Anker-Holth Division, Port Huron, Mich.

GEORGE F. NEILEY has assumed his new duties as assistant to the secretary of Deere & Company, Moline, Ill. Mr. Neiley came to the Deere organization in 1945, and in recent years he has been in charge of the firm's publication advertising program.



FOR PROFITABLE SCREENING USE



5′ x 12′, Type F-600 TY-ROCK SCREEN with Tubular Base.

TYLER VIBRATING SCREENS AND TYLER WOVEN WIRE SCREENS

There is a Tyler Vibrating Screen for every sizing and dewatering job. Tyler Screens are noted for the huge tonnages handled with top efficiency and low cost per ton.

Tyler Woven Wire Screens are made in all meshes and metals in over 10,000 different specifications. Ton-Cap and Ty-Rod Screens with the long-slot openings provide the greatest capacity for a given discharge area.

THE W. S. TYLER COMPANY
CLEVELAND 14, OHIO
Manufacturers of Woven Wire Screens and Screening Machinery

The election of GEORGE W. GUTEKUNST, C. H. RIEMAN, and BRICE D. MADDOX as vice-presidents of the Gardner-Denver Company, Quincy, Ill., has been announced.

Mr. Gutekunst was named general sales manager in 1954 and continues in this capacity. Prior to 1954 he served as Gardner-Denver's district manager in Los Angeles. Mr. Gutekunst has been with the firm's sales organization since 1937.

Mr. Rieman was formerly general manager of the Denver plant. He joined the firm in 1937 and has served in sales in Quincy and San Francisco, as district manager in Duluth, and as sales manager of mining and construction equipment.

Mr. Maddox was appointed general manager of the Keller Tool Division, Grand Haven, Mich., in 1956, and continues in this capacity. He joined Keller Tool in 1951, serving as materials control manager and later as manager of employee relations. In 1955 Keller merged with Gardner-Denver.

Bucyrus-Erie Company, South Milwaukee, Wis., has appointed the Chapman Binder Machinery Co., Union, N. J., distributor for the full line of Bucyrus-Erie excavators and cranes.

Territory covered by Chapman Binder includes the following northern counties of New Jersey: Monmouth, Mercer, Middlesex, Somerset, Union, Morris, Hunterdon, Warren, Sussex, Passaic, Bergen, Hudson, and Essex. In New York, the firm will handle sales and service in Richmond County, except sales in New York City.

Eastern Tractor & Equipment Co., 46 Cove St., Portland, Maine, offers sales and parts service on Bucyrus-Erie excavators and cranes in the State of Maine. An adequate parts stock and complete equipment servicing facilities are maintained at the new distributor's Portland plant and at the branch office on Presque Isle Rd., Caribou.

The first Factory School for authorized distributors was held by The Jeffrey Manufacturing Company's Industrial Division at the Columbus, Ohio, plant. This inaugural session for 1957 was attended by 16 key men for the three-day training on Jeffrey merchandise, crushers and vibrating equipment. Robert D. Prushing, assistant manager of distributor sales, conducted the school.

Certificates of achievement and completion awards were presented to the students by J. E. M. Wilson, vice-president in charge of sales, at the graduation dinner on May 9.

Jeffrey is completing its 80th year of manufacturing conveying, processing, and mining machinery, transmission equipment and special products. Additional Factory Schools are scheduled for this year to supplement the orientation sales meetings staged in the field for Jeffrey distributors.

Appointment of WALTER D. BALDWIN as assistant general manager of the tire division, United States Rubber Co., New York, N. Y., has been announced. Formerly executive assistant to Mr. Cuthbertson, he succeeds John M. Miller, who has retired.

Mr. Baldwin has held a series of important sales posts, and before his present appointment, he had overall responsibility for manufacturers' sales, private brand tire sales and tire engineering activities. He started with U. S. Rubber in 1935 as a tire salesman in the Spokane, Wash., branch. He was made manager of the Salt Lake City district in 1939 and Portland district manager the following year.

All officers and directors of the Allis-Chalmers Manufacturing Company, Milwaukee, Wis., were re-elected at the firm's annual meeting, held recently.

Directors re-elected were: R. S. Stevenson, Fred Bohen, W. C. Buchanan, W. E. Buchanan, Hugh M. Comer, James D. Cunningham, D. A. Forward, Ernst Mahler, Louis Quarles, Boyd S. Oberlink, W. G. Scholl, and J. L. Singleton.

The following officers were re-elected: R. S. Stevenson, president; W. G. Scholl, executive vice-president; B. S. Oberlink, vice-president, Tractor Group; J. L. Singleton, vice-president, Industries Group; W. A. Yost Jr., vice-president, Staff Operations; and W. E. Hawkinson, vice-president and secretary.

FRANKLIN S. SULLIVAN has been named director, materials handling division, Fruehauf Trailer Company, Detroit, Mich. Mr. Sullivan succeeds Edwin Avery, who has resigned.

Mr. Sullivan, who has been in the materials handling field for 21 years, joined Fruehauf in 1956. He was formerly employed by the Ford Motor Company, and the Fisher Body Division of General Motors.

THOMAS S. NICHOLS has been named chairman of the board, and STANLEY DE J. OSBORNE has been named president of the Olin Mathieson Chemical Corporation, New York, N. Y. JOHN M. OLIN has been appointed chairman of the financial and operating policy committee, and will also continue to serve as chairman of the executive committee.

Mr. Nichols has been president of Olin Mathieson since its formation in 1954. Before that he had been chairman of the board and president of the Mathieson Chemical Corporation.

Mr. Osborne has been executive vice-president in charge of the firm's

T. S. Nichols

S. De J. Osborne

International Division since 1954, and in 1956 assumed the additional responsibility of executive vice-president for finance. Prior to that, he had been vice-president for finance of the Mathieson Chemical Corp.

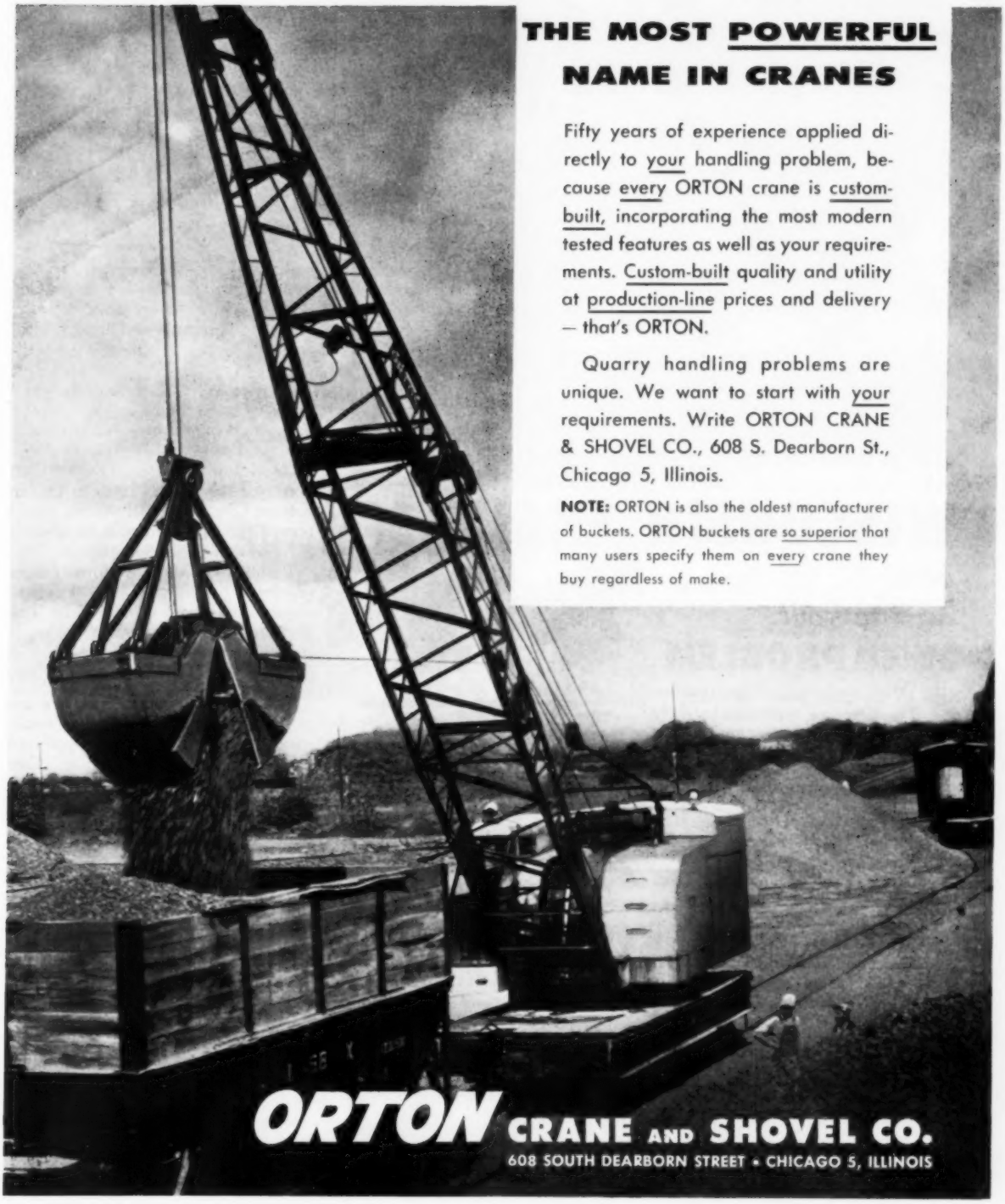
Mr. Olin has been chairman of the board and chairman of the executive committee since 1954. He had previously been chairman of the board and president of Olin Industries, Inc.

Ground-breaking ceremonies, held recently in Hudson, Ohio, marked the beginning of construction on a new 650,000 square foot manufacturing plant for Euclid Division of General Motors Corp. Especially designed for the manufacture of crawler tractors for heavy construction and industrial use, the plant is expected to be in operation by July, 1958.

This crawler tractor manufacturing plant represents the first phase of expansion plans which tentatively call for additional manufacturing facilities, a complete parts warehousing operation, and general offices on the 430-acre site on Route 91, two miles south of Hudson.

Stockholders of The Colorado Fuel and Iron Corp., Denver, Colo., re-elected A. C. Bekaert, A. F. Franz, Charles R. Tyson, and William M. White for three-year terms as directors of the corporation.

ORTON



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Fifty years of experience applied directly to your handling problem, because every ORTON crane is custom-built, incorporating the most modern tested features as well as your requirements. Custom-built quality and utility at production-line prices and delivery — that's ORTON.

Quarry handling problems are unique. We want to start with your requirements. Write ORTON CRANE & SHOVEL CO., 608 S. Dearborn St., Chicago 5, Illinois.

NOTE: ORTON is also the oldest manufacturer of buckets. ORTON buckets are so superior that many users specify them on every crane they buy regardless of make.

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PERFECTLY AS AIR

GAYCO
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Classify practically all dry fine materials

You get:
- CLOSER SEPARATIONS
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RANGE 60 to 400 mesh.
Timken bearings.
Choice of Standard or Heavy-Duty Models.

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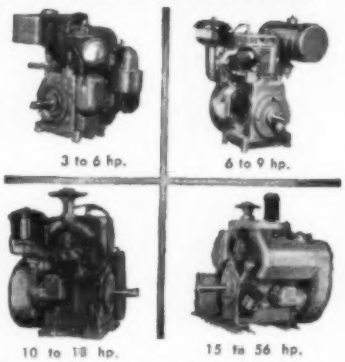
"WISCONSIN ENGINES"
offer the solution
to your
POWER PROBLEM



Next to the basic machine itself, one of your major problems is to select and specify a power component that matches both the equipment and the work it is to do . . . *most advantageously*. Wisconsin Heavy-Duty Air-Cooled Engines merit your critical and serious consideration because:

- Every Wisconsin Engine is of HEAVY-DUTY design and construction in all details . . . with the inbuilt stamina to *take it* under all operating conditions, in any climate, at all temperatures from sub-zero to 140° F
- Basic High Torque design provides the dependable *Lugging Power* that keeps the job moving through the shock-load pinches as well as maintaining a high productive power level under continuous, constant load operation.
- The Wisconsin line offers complete power selectivity to fit both the job and the machine . . . in 4-cycle single cylinder, 2- and 4-cylinder sizes from 3 to 36 hp.

You can't do better than to specify Wisconsin Air-Cooled Engine Power for *your* equipment. Write for bulletin S-195 covering the full line.

WISCONSIN MOTOR CORPORATION
World's Largest Builders of Heavy-Duty Air-Cooled Engines
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Chrysler Marine and Industrial Engine Division, Detroit, Mich., announces the appointment of new Chrysler Industrial Engine dealers in New Jersey and Kentucky.

E. Gross, president of Engines & Parts, Inc., at Rte. 46 opposite Sixth Street, Saddle Brook, Bergen County, is the new appointment in New Jersey.

Cardinal Carryor Company, Inc., 930 E. Mason St., Louisville, Jefferson County, Ky., operated by C. C. Brumleve, president, has been assigned Chrysler Industrial Engine dealer in that area.

Announcement is also made that the name of Great Plains Motor Parts Co. of 818 West Third St., Hastings, Nebr., operated by W. Theisen, has been changed to Industrial-Irrigation Services at the same address.

R. H. JACKSON, director of sales, Boston Woven Hose & Rubber Co., Boston, Mass., has announced the following personnel and geographical changes in the company's sales divisions.

Charles W. Kline, New England division manager, will assume the post of Western division manager, headquartering in Los Angeles. C. E. Hanson, formerly West Central division manager, headquartering in Kansas City, Mo., will assume direction of the Company's South Central division and Dallas warehouse.

Richard C. Mahony, former sales representative in the New England division, has been promoted to New England division manager, headquartering in Boston.

RAYMOND H. JEBENS has been appointed manager of customer application research at The Patterson Foundry and Machine Co., East Liverpool, Ohio. Previously with the Minerals Division of the U. S. Bureau of Mines, Mr. Jebens' appointment is a significant part in Patterson's reorganization of its Sales Division, in which emphasis has been placed on product specialization and customer service. His department will have responsibility for product research and development, in addition to customer applications.

Appointment of the Nickles Engineering Company as sales representative for the New York State area has been announced by the Fielden Instrument Division, Robertshaw-Fulton Controls Co., Philadelphia, Pa. The firm is located at 830 Linden Ave., Rochester, N. Y.

Corralled for Cement and Chemical Lime Manufacturers

The manufacturer who wants the purest limestone—97.8% calcium carbonate—and easily accessible will want his plant fenced in with this deposit.

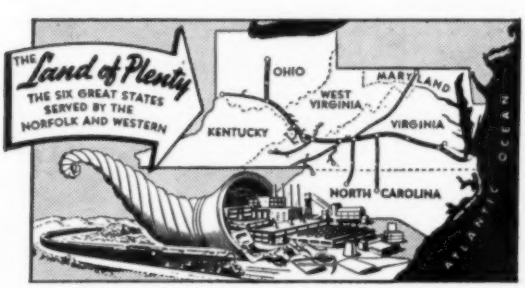
Along the N&W in the Land of Plenty are vast deposits of limestone — some in mineable thicknesses of 100-foot veins, and in one location alone it is estimated that the deposit exceeds 100 million tons.

Of vital importance, too, is the area's abundant supply of underground and surface water . . . home-rooted, high production manpower . . . and strategic location in the middle of a great domestic market.

No need to roam the range. Let the Norfolk and Western's plant location specialists give you full details — in confidence and without obligation — about the many fine industrial sites "next door to limestone deposits."

Write, Wire or Call—

L. E. Ward, Jr., Manager
Industrial and Agricultural Department
Drawer PQ-766 (Phone Diamond 4-1451, Ext. 474)
Norfolk and Western Railway
Roanoke, Virginia



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40% FASTER
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● The McCarthy Vertical Auger Drill cuts drilling time in earth, clay, compacted sand and gravel, hard pan, shale, sandstone and rock as much as 40%. Rugged construction permits you to drive 2 to 24-inch augers to depths of as much as 125' faster than any other drill. Get the facts on the powerful McCarthy today. See how you can complete shot hole, exploration drilling, foundation holes, dewatering operations, well drilling, highway construction and heavy contract work faster than ever before. The versatile, vertical McCarthy gives you more than any other drill. Write for Bulletin M-100 now. Let us show you how you can turn new profits on your drilling job.

McCarthy Vertical Auger Drill Model 106-24

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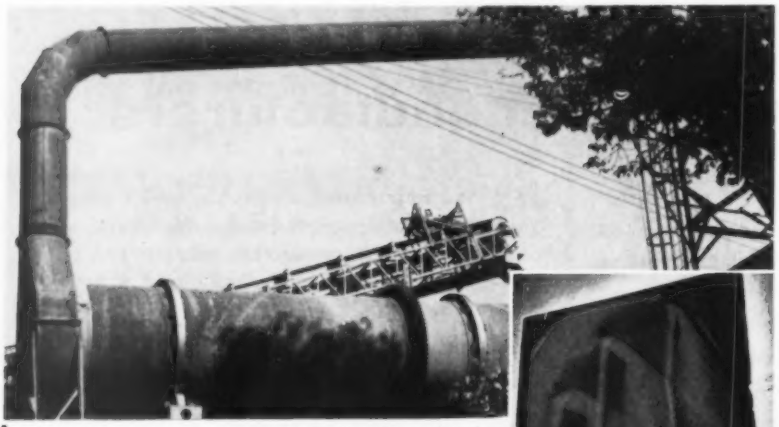

▲ TOP: This 7'-0 x 30'-0 rotary dryer removes excess moisture. Dryer is oil heated.

RIGHT: The lifters, with their unique cup-like design and their staggered arrangement in the unit, cause the sand particles to be evenly distributed and greatly increase the capacity and efficiency of the dryer. ▶

A McDermott Dryer Installation at the North American Refractories Plant at Little Gap, Pa.

Sound Engineering Economy and Consistently Superior Performance Are Built Into All McDermott

Dryers • Coolers • Kilns

McDERMOTT BROS. CO.

Allentown Pennsylvania

Phone HEMLOCK 3-3231

DON S. PERMAR has been named to the newly-created position of assistant general sales manager for the Le Roi Division, Westinghouse Air Brake Co., Milwaukee, Wis.

Mr. Perman has been field sales manager for Le Roi since September, 1954. Prior to that time, he was sales manager of stationary air compressors. He joined Westinghouse Air Brake Co. as a pneumatic engineer in 1945, and came to the Le Roi Division in 1954.

The new position will increase his activities and responsibilities in all functions pertaining to operations of the sales department. Mr. Permar will continue to be directly responsible for the operation of the field sales staff.

Fort Worth Steel & Machinery Company, Ft. Worth, Tex., has announced the appointment of the Reliable Bearing & Supply Company of San Bernardino, Calif., as a distributor of *Fort Worth* materials handling equipment. Reliable's principal store is at 263 South E St., San Bernardino. The firm has a branch at 246 S. Towne, Pomona.

Reliable has stocked a wide variety of *Fort Worth Beeline* screw conveyors and accessories to serve the needs of the area, which includes all of San Bernardino and Orange counties, parts of Los Angeles, Kern and Riverside counties in Southern California, and Clark County, Nev.

Associated Bearings Company, 2918 McGee Trafficway, Kansas City, Mo., has been appointed a distributor of *Fort Worth* mechanical power-transmission equipment in western Missouri and eastern Kansas.

JAMES D. EVANS has been named field representative for the Republic Rubber Division, Lee Rubber & Tire Corporation, Youngstown, Ohio. Mr. Evans is responsible for the sales and service of Republic's line of belting, hose, packing, and molded and extruded products in Mississippi, Louisiana, and part of Alabama.

Arden B. Molstad has been appointed field representative for the *Republic* line in the New England area with headquarters in Boston, Mass.

ROBERT G. OAKLEY, manager of the Akron, Ohio, branch of The White Motor Company for the last three years, has been named assistant to the vice-president in charge of the Autocar Division, Exton, Pa.

39,000# digging force plus "high leverage" contour of rocker arms . . give the Eimco 105 Excavator more digging force per pound of weight than any comparative machine.

Dumping into haulage units or fills, ability to discharge without turning gives the Eimco more productive motion per unit of expelled energy than any other earthmover.

Even With 100 ft. Round-Trip Cycle

THIS EIMCO EXCAVATOR MOVES 1050 TONS IN 7 HOURS

An Eimco 105 Excavator loads out large boulders and loose overburden without the aid of preliminary shooting . . . hauls 50 ft. to the edge of a fill . . . and discharges 500—3-ton-loads every 50 minute work hour.

Ability to complete a cycle without turning is a big Eimco Excavator advantage, regardless of haul length. But as travel distance decreases, the 105's loading speed increases in much greater proportion than that of conventional loaders.

When trucks can be spotted a few feet behind, and with good availability . . . the 105 can complete 6 cycles per minute and toss between 600 - 800 tons of heavy rock over its back every hour.

On projects with confined working space, the Eimco Excavator's cubic yard capacity per $ of investment increases sharply while the conventional loader's value decreases. Loading in tight quarters or on narrow benches, conventional machines must maneuver "back and forth" to reach dump position. This curtails production, increases operator fatigue jeopardizes safety and "bottlenecks" hauling operations. These profit-stealing disadvantages are eliminated by the 105.

With either the Excavator or the Eimco 105 Front-End Loader (2½ yd., 40,000# break-out) you get a big mobility edge. Under full load . . at top speed . . moving forward or reverse . . both 105 Loaders respond instantly to gear reversals, high-lo shifts, independent track operation - all controlled by easy - to - operate, power - shift levers.

An Eimco Sales Engineer will be happy to conduct a time study of your operation and show you the way to more profit!

EIMCO FRONT-END LOADER

THE EIMCO CORPORATION

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Cleveland, Ohio Houston, Tex. London, England Gateshead, England Paris, France Milan, Italy Johannesburg, South Africa

B-979

PERRY A. WHITE, general controller of the Baldwin-Lima-Hamilton Corporation, Philadelphia, Pa., has been given the new position of vice-president and general manager of B-L-H's Eddystone Division, Eddystone, Pa.

ROBERT G. TABORS, vice-president and assistant general manager of the corporation's Hamilton Division, Hamilton, Ohio, has been named vice-president and general manager of the Electronics & Instrumentation Division, Waltham, Mass.

In 1943 Mr. White joined the General Machinery Corp., Hamilton, Ohio, which later merged with Baldwin-Lima-Hamilton. In 1952, he was transferred to the Eddystone Division as controller, and in 1953 was made general controller and a director.

P. A. White

R. G. Tabors

Mr. Tabors joined the Testing Machine and Instrumentation Department at the Eddystone Division in 1937. He has served the firm in various capacities, including sales manager for hydraulic presses and power tools at Eddystone, manager of the Aircraft Turbine Department, and sales manager of machinery and foundry products.

The Detroit Diesel Engine Division of General Motors, Detroit, Mich., has announced the appointment of the Western Engine Co. as distributors of the Division's line of two-cycle diesels in the Chicago and Northern Illinois area.

The distributor is a new corporation formed for the sale and service of industrial and marine engines, exclusively. Officers of the company are also associated with the Western Machinery and Engine Company, Detroit Diesel distributors in St. Louis since 1945. They are Hugh Scott, chairman of the board; John Lundahl, president and general manager; Gilbert Weidlich, vice-president; and Hugh Scott, Jr., secretary and treasurer.

E. O. MARTINSON, president and general manager of Koehring-Waterous Ltd., Brantford, Can., has been brought to the central office of the Koehring Company in Milwaukee, Wis., to assume the newly-created position of vice-president in charge of research and development for Koehring's eight divisions and subsidiaries.

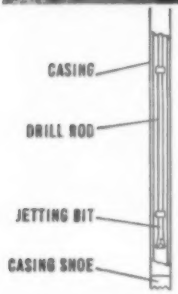
D. W. Marchant, vice-president and general manager of Koehring Southern, Chattanooga, Tenn., has taken over the Koehring-Waterous position vacated by Mr. Martinson. Harry S. Jeske, general superintendent at Koehring Southern, succeeds Mr. Marchant.

Nearly 100 Raybestos-Manhattan executives and representatives of sales and engineering from several divisions were recently informed on ways of increasing usefulness of Industrial Rubber and Mechanical Packings and how industry will benefit. This 1957 National Sales Workshop was the largest group ever assembled for an R/M Sales-Engineering session. It was a week-long combined meeting of Industrial Rubber and Mechanical Packing Divisions. The Workshop took the form of daily panel discussions with many representatives participating.

What's down there?

Empire
TEST DRILLS
come up with the
RIGHT ANSWERS

EMPIRE
Hydraulic
Testing
Drill



This test-drilling equipment is a "must" for pit and quarry operators and general contractors.
The EMPIRE Junior Drill used manually with solid rods or the EMPIRE Hydraulic Jetting Drill, using hollow rods, is the standard method of exploring sand and gravel deposits for composition and presence of clay, and accurately determines overburden depth and formation.
Easily transported in any kind of terrain. Assembled and ready for work in minimum time with ordinary labor.

Write TODAY for complete details

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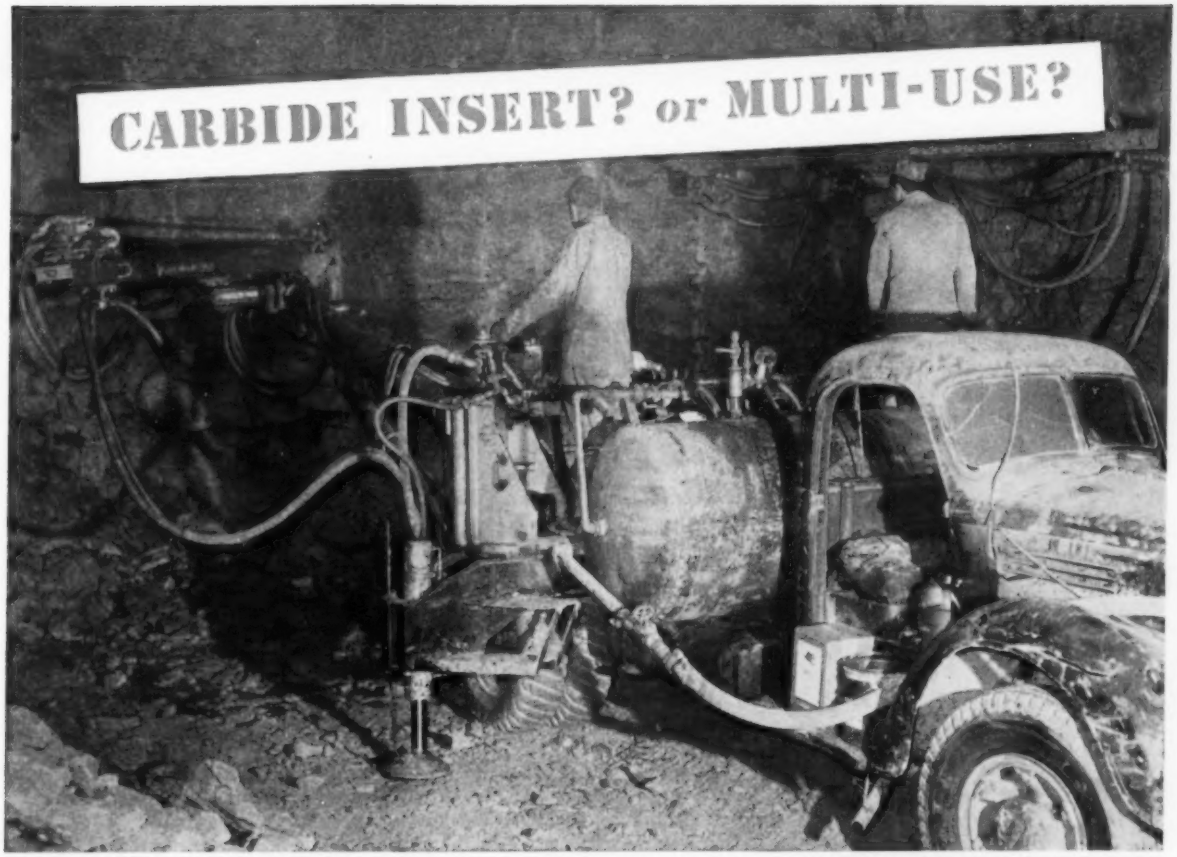

LOCATION: Limestone Quarry, Douds, Iowa

OPERATING CONDITIONS: Hard Limestone

TIMKEN® carbide insert bits help cut our costs one-third...

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DOUDS STONE, INC., drills hard limestone faster and at far less cost with Timken® carbide insert bits. They get full increments of steel in this hard, abrasive ground, drill constant-gauge holes, get lower cost per foot-of-hole.

You can cut your cost per foot-of-hole, too, in hard abrasive ground with Timken carbide insert bits. They're designed for drilling extremely deep holes, constant-gauge holes, or small diameter blast holes where the going is tough. Timken carbide insert bits are your best bet under these conditions.

But carbide insert bits may not always be your best bet. When drilling in ordinary ground and if full increments of steel can be drilled out, you'll get your lowest cost per foot-of-hole with Timken multi-use bits.

Your drillers save time when you use Timken rock bits —carbide insert or multi-use. They're interchangeable in the same thread series. Your drillers can change bits as fast as the ground changes. No need to change drill steel. Dozens of bits fit the same steel.

You get other important extras with Timken bits, too. They're made from Timken's own electric furnace fine alloy steel. They have the special shoulder union to protect threads from drilling impact. And because chips clear faster, there's no excessive wear.

Get expert advice on which Timken bits will do the most for you. Call or write the Timken Rock Bit Engineering Service. The Timken Roller Bearing Company, Rock Bit Division, Canton 6, Ohio. Cable address: "TIMROSCO".

Timken threaded multi-use rock bit

Timken threaded carbide insert rock bit

*your best bet for the best bit ...for **every** job*

TIMKEN

TRADE-MARK REG. U. S. PAT. OFF.

HORACE Y. BASSETT, executive vice-president of Calumet & Hecla, Inc., Chicago, Ill., has been elected president and chief executive of the firm. Mr. Bassett succeeds Endicott R. Lovell, who, having reached the company's normal retirement age, has been named chairman of the board and chairman of the executive committee.

Mr. Bassett joined Calumet & Hecla in 1942 when the company acquired the Wolverine Tube Co., of which he was factory manager. In 1944 he became general manager of the Wolverine Tube Division, and in 1948 he became a vice-president of the company. Mr. Bassett was elected executive vice-president last year.

Mr. Lovell has been associated with Calumet & Hecla since 1919. He has served the firm in many capacities, including that of assistant superintendent of the smelting works, superintendent of the smelting works, general superintendent, and general manager of C&H. In 1943 he was made a vice-president and director, succeeding to the presidency the following year.

H. Y. Bassett

S. H. Fulkerson

STUART H. FULKERSON has been appointed executive vice-president of the Cross Engineering Company, Carbondale, Pa. Mr. Fulkerson joined Cross in 1947 as secretary-treasurer, and later became vice-president in charge of manufacturing. In his new capacity as executive vice-president, Mr. Fulkerson will function as the chief administrative officer of the company's Carbondale operations.

Products of Cross Engineering include the Cross Screen Plate, used for sizing and selection in ore mining, and used by processors of crushed stone, sand, and gravel.

PERRY A. WHITE, general controller of the Baldwin-Lima-Hamilton Corp., Philadelphia, Pa., has been elected to the board of directors. He succeeds Marvin W. Smith, who is retiring as chairman of the executive committee.

The appointment of Ross MILLER as sales manager for Gar Wood—St. Paul dump truck bodies and hoists has been announced by Gar Wood Industries, Inc., Wayne, Mich. In his new position, he will coordinate and supervise all sales activities for the complete line of Gar Wood—St. Paul dump truck bodies and hydraulic hoists.

Mr. Miller, well known in the truck equipment field, has been with Gar Wood Industries since 1920. He has held the positions of national service manager; regional manager; Pacific Coast general manager; and sales manager for Gar Wood Industries' Mattoon, Ill., plant.

W. E. STEINWEDELL, one of the founders of The Gas Machinery Company in 1902, has retired from active service after 55 years on the board. Mr. Steinwedell has been named honorary chairman of the board and remains a consultant to the company.

Elliott Donnelley and William Steinwedell have been named to the board of directors of Gas Machinery. Continuing as directors are D. H. Throburn, president; Robert Kyle, vice-president; John L. Knutsen, secretary; and C. M. Hamlink.

The Gas Machinery Company designs, builds, and erects gas plant equipment, industrial furnaces, and chemical process equipment.

DON FRICKER has been appointed general supervisor, industrial advertising and sales promotion, for the J. I. Case Company, Racine, Wis.

Mr. Fricker will direct a greatly expanded advertising program to promote Case's new industrial line of 20 wheel and crawler tractors, and over 50 combinations of integrated earthmoving and materials handling equipment. His duties will include supervising national and regional trade publication advertising, public relations, and dealer newspaper, radio, and direct mail promotion.

RAYMOND F. ALLEN has been named vice-president and director of marketing and sales for the Thermoid Company, Trenton, N. J. Mr. Allen will supervise all sales activities.

JOHN R. WOOD, vice-president and treasurer of the Clark Equipment Company, Buchanan, Mich., has been elected to the board of directors of The Hays Corporation, Michigan City, Ind.

The new board of directors of Fairbanks, Morse & Company, Chicago, Ill., has elected ROBERT H. MORSE JR. president and chief executive officer. In addition, 14 officers were elected, including four who will occupy new positions.

In new posts are: Gordon R. Anderson, vice-president, engineering; F. M. Mason Jr., vice-president, government business; Robert Dana Brown, secretary and assistant treasurer; and R. E. Whiteley, assistant secretary.

Re-elected were: Robert B. Craig, vice-president; John A. Cuneo, vice-president, foreign operations; L. R. Gaiennie, vice-president, personnel; Donald L. Harwood, vice-president, purchases; Orren S. Leslie, vice-president, manufacturing; G. J. Malone, vice-president, comptroller; R. H. Morse III, vice-president, budgets and planning; V. H. Peterson, vice-president, sales; L. W. Stolte, vice-president, treasurer; and E. T. Sandeen, assistant secretary.

JACQUE JONES was elected president of the Huber-Warco Company, Marion, Ohio, at a recent meeting of the board of directors. His advancement from the post of executive vice-president fills the vacancy created by the retirement on May 1 of DON A. HOWARD, who has been president since 1943.

Mr. Jones had served as executive vice-president since the former Huber Manufacturing Company and the former W. A. Riddell Corporation, Bucyrus, were combined over two years ago. Prior to the Huber-Warco consolidation, Mr. Jones had been vice-president and general manager of the W. A. Riddell Corporation.

Mr. Howard's retirement ended 33 years of service as a company officer. He continues as a member of the board.

ROBERT T. SMITH has joined the Kraft Bag Corporation, New York, N. Y., as sales engineer for multiwall bags and the *Kraftpacker* open mouth bag filling machine in Alabama and western Tennessee.

Mr. Smith will operate out of Birmingham, Ala., replacing R. A. KURLANDER, who has been transferred to the company's main office in New York to cover New York State and the New England area.

R. F. HOBBS has joined the sales staff of Kraft Bag Corp. He will handle the sales of multiwall bags and *Kraftpackers* in northern Ohio and Michigan, operating out of the company's Chicago office.

DISCOVER

DAVIS

THE EQUIPMENT THAT LEADS THE WAY

Another Davis First . . . Low-Cost, Completely Detachable Truck-Mounted Back-hoe.

The Davis Back-hoe, Running Mate to the Davis Loader, Can Work at Right Angles.

FOR MORE PRODUCTIVE *LOADING TIME*

There's a reason why the man with a Davis Loader gets more work done... that's because the Davis Loader is designed to handle more jobs, and handle them easily and efficiently. Its widely copied "step-in" design... so popular that others have been forced to adopt it... is just one of the many features. Rugged construction, built to take the hard jolts and requiring less maintenance is another. Streamlined design gives maximum visibility and maneuverability. Little things, too, like an oil filter (standard only on Davis) and centralized hydraulic system, add up to make it your best loader buy whether you look at it from a dollar value or from a performance standpoint. Compare it, you'll agree. And don't settle for second best. Insist upon Davis.

Available for most popular makes of tractors and from better dealers in the United States and Canada. Write for literature and dealer's name

MID-WESTERN INDUSTRIES, INC.
1009 SOUTH WEST STREET, DEPT. Q
WICHITA 15, KANSAS

Hewitt-Robins Incorporated has prepared a 17-minute color film entitled *Moving a Mountain Into a Lake*, which describes how giant electric shovels are tearing down a 30,000,000-ton mountain of earth and rock to build a new 13 mile roadbed across the Great Salt Lake for the Southern Pacific Railroad. The earth and rock are transported 2 miles from the mountain to the lake by a Hewitt-Robins belt conveyor system of unusual design.

The film shows how the whole operation is carried out, and gives a detailed explanation of how Hewitt-Robins designed, manufactured, and erected the 2-mile conveyor system. Groups interested in seeing the film may borrow a print from Hewitt-Robins, Inc., Stamford, Conn.

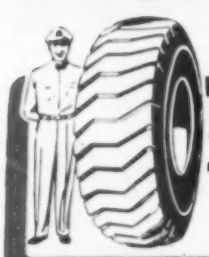
Joseph T. Ryerson & Son, Inc., Chicago, Ill., has announced two appointments at its Wallingford, Conn., steel service plant. Richard T. Rollison has been named manager of the reinforcing steel products department, and William J. Waller has become manager of the work order department.

Get exactly the tread design your job requires at SOUTHERN TIRE

At your service—the world's most complete range of tire sizes and tread designs in one shop—now at Southern Tire Company!

Whether you operate light or heavy equipment, Southern Tire can supply the tread design and size you need —and save you money at the same time. Superior equipment, including the greatest range of tire sizes and tread designs in the country, and the world's largest and finest three-sectional retreading mold, enables Southern Tire to retread any tire, regardless of growth, without buffing to the breaker strips. This, plus Southern Tire's long experience and use of finest tread rubber, assures you of guaranteed new tire service—and the tread design you need—at less than half new tire cost.

All special service tire sizes from 1100 x 24 to 33.5 x 33
Call your favorite dealer and specify Southern Tire retreads



SOUTHERN TIRE COMPANY

1414 Broadway
SHEFFIELD, ALA.

Phone Collect
EV 3-2312

Bailey Meter Company, Cleveland, Ohio, announces the election of two new officers and a new director. C. E. SUTHERLAND, factory manager, has been elected vice-president in charge of manufacturing; E. O. STERN, auditor, has been elected treasurer and assistant secretary; and H. H. GORRIE, vice-president, has been named to the board of directors.

Mr. Sutherland, who joined Bailey Meter Co. 26 years ago, was appointed factory superintendent in 1942, and factory manager in 1954.

Mr. Stern, who started with Bailey Meter as a clerk in 1941, was appointed auditor in 1950.

Mr. Gorrie joined Bailey Meter as a cadet engineer. He was named head of the design department in 1943, assistant chief engineer in 1944, and chief engineer in 1953.

The White Motor Company, Cleveland, Ohio, has purchased the assets of Reo Motors, Inc., Lansing, Mich., from the Bohn Aluminum & Brass Corporation. Acquisition of Reo was a logical step in White's expansion program which is aimed at broadening its markets, according to Robert F. Black, chairman of the board and chief executive officer of White Motor Co.

Reo will be operated as a division of The White Motor Company, under the direction of John C. Tooker, who will be general manager. Reo's general offices, including manufacturing and sales, will continue to be at the present plant in Lansing, Mich.

The appointment of MELVIN K. JENNINGS as director of public relation for The Eimco Corporation, Salt Lake City, Utah, and its subsidiary units has been announced. Mr. Jennings, previously affiliated with the United Press Association, a national news wire service, joined Eimco in January.

In addition to its main mining equipment and heavy-duty tractor plant at Salt Lake City, Eimco also operates the American Foundry Co., the Structural Steel and Forge Co., and the Eimco Filter Division.

ROBERT R. REESE is the new southeastern regional sales manager of the Galion Allsteel Body Company, Galion, Ohio, according to a recent announcement. Mr. Reese's duties include the supervision of the sales of Galion Allsteel dump bodies, hoists, and hydraulic tailgates.

65 belt hp!
up to 15,500 lb drawbar pull!
forward speeds from 1.5 to 5.5 mph!
reverse to 4.1 mph!

ALLIS-CHALMERS

HD-6

Tractor-Dozer

MORE POWER—BETTER DOZING SPEEDS—BIG-DOZER DESIGN—NEW HANDLING EASE!

Only dozer of its size with these basic advantages . . . engine-mounted rams, long push beams, fewer linkage points (only 2 instead of 5 or 6). These big-dozer features all combine to provide more accurate, gouge-free dozing . . . longer equipment life.

Convenient rotary-valve blade control makes the HD-6 the easiest handling dozer of its size. With more than 5½ feet of track on the ground, it has outstanding flotation . . . yet turns easily in any terrain. The HD-6 also combines large, low-set front idlers with a blade snugged close to the radiator guard . . . to provide balance that means better dozing, more work done under any conditions!

You can <u>see</u> it . . . but there's only one way to <u>prove</u> it—on **your** job!

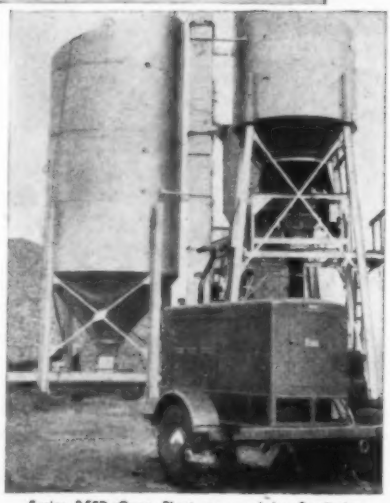
ELECTRIC PLANT NEWS

On-site cement plant operates with Onan power

35KW Onan Electric Plant powers 15 H.P., 5 H.P. and two 2 H.P. motors, vibrator, controls, welder and lights

It's a completely electrified operation . . . even to electric lights in the mobile office nearby . . . yet this bulk cement plant is far distant from the utility highline. The Onan heavy-duty, water-cooled electric plant runs continuously during working hours with a minimum of servicing. It has the capacity to provide electricity for miscellaneous lights, tools, motors and communications, too.

Other A.C. models: 500 to 75,000 watts. Also D.C. and battery charging units.



Series 35ED Onan Plant, powered by 8-cylinder gasoline engine, provides all the electricity needed. Trailer mounted, it is easily moved from site to site. Weatherproof housing.

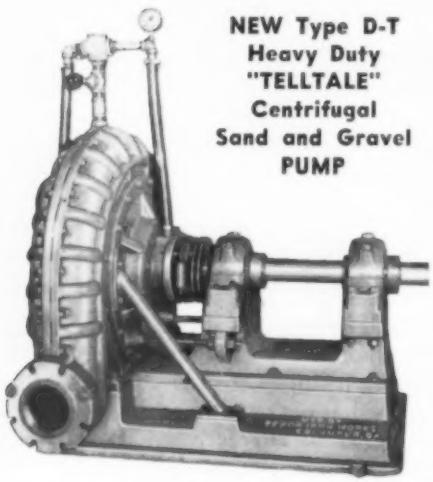
See your Onan distributor or write for literature

D. W. ONAN & SONS, INC.

3771 University Ave. S.E., Minneapolis 14, Minnesota

ELECTRIC PLANTS • AIR-COOLED ENGINES • KAB KOOLER • GENERATORS

A LONE COMPLAINT IN A PUMP'S FIRST YEAR



NEW Type D-T Heavy Duty "TELLTALE" Centrifugal Sand and Gravel PUMP

Fred Girod, Vicksburg, Miss. telephoned: "How can I reduce my pump's production? My screen and washer can't take it."

The Taylor Sand Company's 8" pump at Junction City, Ga. is loading five, frequently six, 60-ton cars of sand per hour.

"Telltale" is the only pump that warns when it's time to reline. Air sucked through periphery ports causes pump to loose its prime. Pumping stops. Water leaking through the ports signal that the shell liner and the surrounding belt of packing have worn through.

Available with either tough semi-steel or best-in-the-long-run Ni-Hard wearing parts in 4", 6", 8", 6 x 8" suction and 8 x 10" suction. Now available also in either alloy, 45 and 90° extra-heavy long-radius flanged elbows. Write for Type D-T Heavy Duty folder and prices.

PEKOR IRON WORKS, INC.

ESTABLISHED 1892

LOCK DRAWER 909 COLUMBUS, GEORGIA

J. N. BAYLEY has been promoted to the position of manager of the Atlanta Branch of the J. I. Case Company, Racine, Wis. Mr. Bayley, for the last three years assistant manager in charge of sales for the Atlanta Branch, replaces T. E. Moss, who has resigned.

The Atlanta Branch supervises the southeastern area, which includes Georgia, Alabama, Florida, and part of North Carolina and Tennessee, and is now handling the distribution of Case industrial crawler and wheel tractors, in addition to agricultural tractors and machinery.

Mr. Bayley has been with Case for 17 years, working in different capacities in office, collection, and sales work. He spent several years in the Dallas Branch working different territories in Texas and Louisiana. In 1949 he was appointed assistant manager of sales at the Oklahoma City Branch, and later held the same position at the Atlanta Branch.

Diamond Iron Works, Division of Goodman Manufacturing Company, Chicago, Ill., has appointed Construction Machinery Co., 2175 Newton Ave., San Diego, Calif., a distributor in California for the counties of Imperial and San Diego.

Officials of Diamond Iron Works have also announced the recent appointment of JAMES HART, Eastland, Tex., as district sales manager in the states of Arkansas, Louisiana, Texas, Oklahoma, New Mexico, and Arizona.

JOHN A. NAGLE, district sales manager for Diamond Iron Works in the central states and eastern Ontario, died recently at his home in Milwaukee. Mr. Nagle had been a member of the Diamond sales staff since 1940.

Rome Cable Corporation, Rome, N. Y., has purchased the plant, equipment, and other assets of T. J. Cope, Inc., Collegeville, Pa. Manufacturing facilities for the Cope Company, producer of special products for the electrical industry, are located in a recently-acquired modern factory in Collegeville.

Rome Cable Corporation has an electrical wire and cable plant in Rome, N. Y., and in 1950 purchased an electrical conduit manufacturing firm in Torrance, Calif.

WILLIAM B. DENNISTON has been named sales manager of Panellit, Inc., Skokie, Ill., designer, engineer, and fabricator of complete information systems for industry.

You can see it, but there's only one way to prove what the HD-6 can do for you!

Call your nearby Allis-Chalmers construction machinery dealer —he'll demonstrate one on your job NOW!

. . . or send us this

Allis-Chalmers
Construction Machinery Division
Milwaukee 1, Wisconsin

Gentlemen:

Please have the Allis-Chalmers construction machinery dealer serving my area arrange a demonstration of the HD-6 tractor-dozer for me.

Name_____

Address_____

City_____ State_____

Type of Work_____

Industry Personalities

R. G. Conner

ROBERT G. CONNER, formerly public relations representative for Kaiser Services, has been appointed director of publications and advertising for the Permanente Cement Company, Oakland, Calif.

Associated with the Kaiser companies since 1948, Mr. Conner has also served as publications manager for Kaiser Services and public relations representative for Kaiser Aluminum & Chemical Corporation at New Orleans, La.

EDWIN K. BORCHARD has been appointed technical consultant for the Keystone Portland Cement Company, Philadelphia, Pa. Mr. Borchard has been on the Keystone staff for over 22 years.

JOHN F. HALL has been named manager, technical department, with headquarters in Keystone's New York City Office. Mr. Hall was previously associated with the Pavlo Engineering Company, New York, N. Y., as project engineer on design in connection with the Federal Highway Program.

JOHN F. MAGEE was named board chairman and ROBERT S. GERSTELL president by Alpha Portland Cement of Allentown, Pa. HOWARD HANKS has retired from the vice-presidency but continues as a consulting engineer.

GEORGE W. ROBERTSON has been appointed superintendent of the Haverstraw, N. Y., plant of the New York Trap Rock Corporation. Mr. Robertson replaces Edward G. Sullivan, who has resigned.

FRANK J. ANDERSON has been named assistant plant manager of the Dragon Cement Company, Inc., a division of the American-Marietta Company, Northampton, Pa. EUGENE MILHAM was appointed chief chemist, and THOMAS J. HYNES, construction engineer.

Directors of the American Smelting and Refining Company, well-known producer of metals, fluorspar, and asbestos, have announced three management appointments.

KENNETH C. BROWNELL, formerly president of the firm, has become chairman of the board.

R. WORTH VAUGHAN was appointed president. Mr. Vaughan joined American Smelting in 1937, and was elected executive vice-president in 1955.

OSCAR S. STRAUS, formerly vice-president and treasurer of ASARCO, was appointed chairman of the finance committee, succeeding JOHN C. EMISON, who has retired.

ROGER W. STRAUS, board chairman, has also retired, but will continue to serve ASARCO as a director.

ROBERT M. CORCORAN has been appointed assistant traffic manager at the Pittsburgh, Pa., office of the Universal Atlas Cement Company. He succeeds C. CLIFFORD MILLIKEN, who has retired after 32 years of service with the firm.

Mr. Corcoran joined the U. S. Steel Corporation in 1952, holding various positions until his appointment to Universal-Atlas, a U. S. Steel subsidiary, in 1956, as traffic representative in the Pittsburgh office.

In his new position, Mr. Corcoran will have responsibility for traffic and transportation matters relating to Universal Atlas plants at Universal, Pa., and Fairborn, Ohio.

ROBERT H. ALLEN has been named general manager of the Presque Isle Corporation, Cleveland, Ohio. Before joining Presque Isle at its Stoneport operation, Mr. Allen served eight years as quarry superintendent for National Gypsum at National City, Mich., and two years as plant engineer for U. S. Gypsum at Alabaster, Mich.

MELVIN H. BAKER, chairman of the board of the National Gypsum Company, was named the 30th recipient of the Chancellor's Medal of the University of Buffalo.

The university confers the medal, its highest honor, to recipients who "personify civic patriotism and vivify public service in the eyes of the citizens of Buffalo."

MORTIMER R. PROCTOR has been elected board chairman and president of the Vermont Marble Company of Proctor, Vt., to succeed his late uncle, Redfield Proctor

Several changes and promotions have been announced by executives of the General Crushed Stone Company, Easton, Pa.:

THOMAS C. FOOTE is now assistant to the vice-president in charge of sales.

WILBUR R. SMALLWOOD was named assistant district sales manager, reporting to W. H. Litteer in Watertown, N. Y.

EDWARD D. BARTON was appointed assistant district sales manager, reporting to Mr. Litteer in Jordanville, N. Y.

FREDERICK E. BURNHAM has been made district sales manager, reporting to J. K. Scott in Rochester, N. Y.

JOHN C. HAYES was appointed assistant district sales manager, reporting to H. M. VanCleve in Syracuse, N. Y.

J. K. JENSEN, chairman of the board and former president of the Janesville Sand & Gravel Company, Janesville, Wis., and J. R. JENSEN, vice-president of the firm since 1908, have announced their retirement. They will continue to serve as directors.

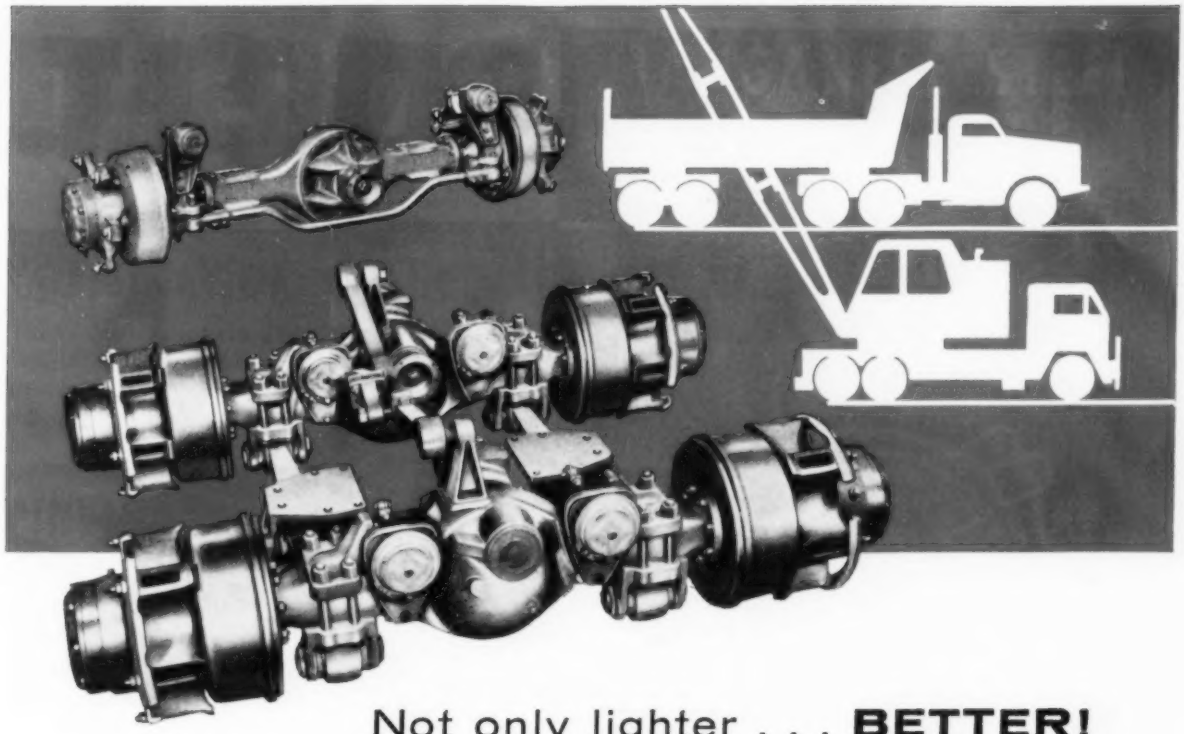
Election of GEORGE F. MEYER as vice-president and production manager of Janesville Sand & Gravel; G. ROY JENSEN as vice-president in charge of sand and gravel operations; and JOHN D. HUSEN as vice-president in charge of sales, was announced by directors of the firm.

CHARLES R. DODSON has been elected to a one-year term as treasurer of the American Institute of Mining, Metallurgical, and Petroleum Engineers, succeeding Gail F. Moulton. Mr. Dodson will also serve as controller, and is a member of the board of directors. Mr. Dodson, who joined A.I.M.E. in 1944, has had an extensive career in mechanical and petroleum engineering, direction of major enterprises, and engineering education.

Two recent appointments have been announced by officials of the Monarch Cement Company, Humboldt, Kans.

VERNON W. BARLOW has been appointed vice-president, sales, and HARRIS V. FEGELY was named vice-president, operations.

JOSEPH C. SMITH has been promoted to the position of assistant to the president of The Cleveland Quarries Company, South Amherst, Ohio. Mr. Smith has been associated with the firm since 1955, serving as a sales representative.



Not only lighter . . . **BETTER!**

CLARK Tandem Drive

for 4 x 6 and 6 x 6 units with 2 Planetary Axles

There's nothing new about tandem-drive for 6-wheel vehicles—old stuff. There's something agreeably new—*mighty profitably new!*—in the Clark Tandem Unit with *two planetary drive axles*. That truly is good news in a double dose.

You've heard plenty, and it's all good, about the Clark Planetary Axle.

Better Torque Distribution—Final reduction in the drive-wheel hub eases the torque load on all power-transmitting parts.

70% Less Torque-Load on Shafts—No longer do axle shafts receive the full shock-load. No more huge axle shafts that twist in two near the differential splines: broken shafts practically unknown.

Stronger Axles Even Though Lighter—Important savings in dead weight—because of reduced torque loads, parts can be lighter, smaller, yet last longer.

It's a great story—better get it. Use the coupon.

CLARK® EQUIPMENT

CLARK EQUIPMENT COMPANY • AXLE DIVISION, Buchanan 21, Mich.
Please send illustrated bulletin on the Clark Planetary Axle.

NAME _____ POSITION _____

FIRM _____ ADDRESS _____

CITY _____ STATE _____

STOP VARNISH!

Refill now with Sinclair SUPER TENOL® Motor Oil for top protection against harmful varnish in your Diesel engines.

No matter how rushed the job, SUPER TENOL protects your engine against the effects of high temperature, over-loading and *continuous stop-and-go*. Your Diesel stays on-the-job longer, with less wear . . . fewer repairs.

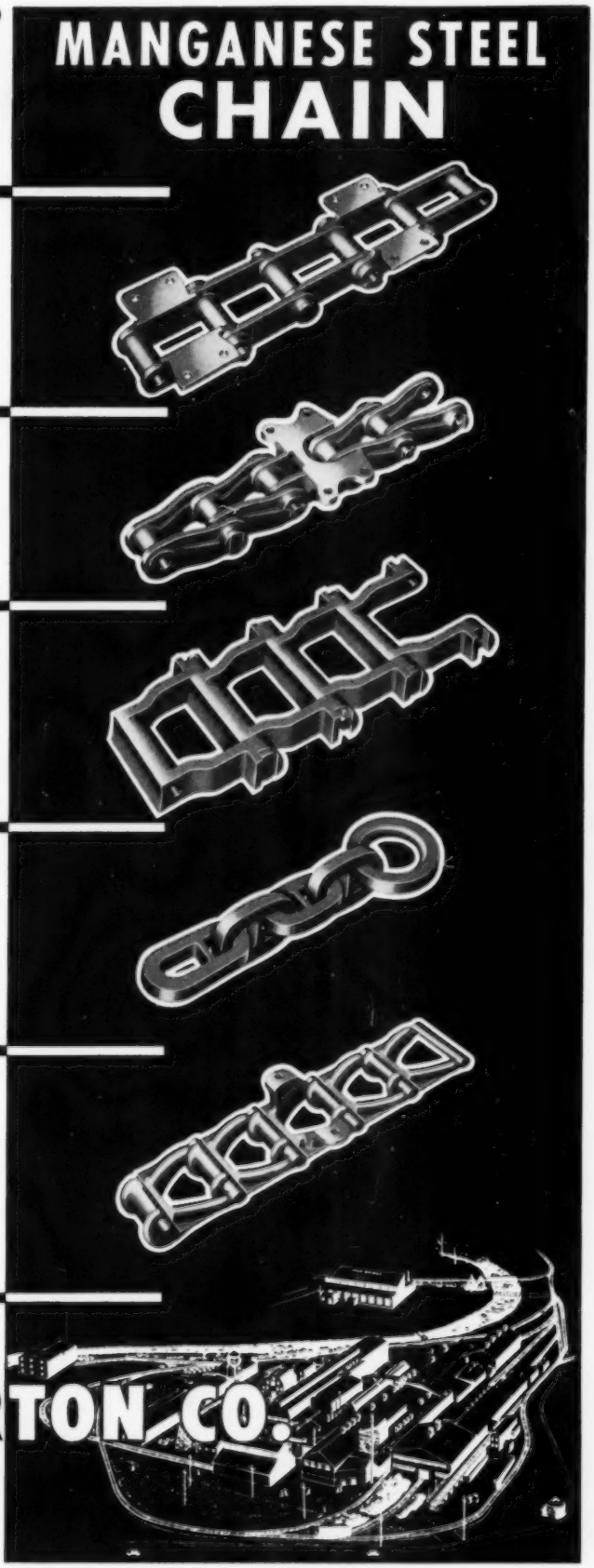
You get these benefits from Sinclair SUPER TENOL because it's specially made for *severe duty*. High viscosity index base oils, plus a heavy concentration of selected additives, have been combined to give you maximum protection against varnish, sludge, rust, and acid corrosion.

Refill now with Sinclair SUPER TENOL. Contact your local Sinclair Representative for further information or write Sinclair Refining Company, Technical Service Division, 600 Fifth Avenue, New York 20, N. Y. *There's no obligation*

SINCLAIR SUPER TENOL

TISCO®

MANGANESE STEEL CHAIN



COMBINATION CHAIN

TISCO combination chain is made of tough, abrasion-resistant manganese steel for extra long wear. Reinforced side bars provide more bearing area, reduce pin wear and cutting.

PINTLE CHAIN

Used in elevators, conveyors, etc., rugged TISCO pintle chain actually becomes tougher as it wears and is unsurpassed for durability.

DRAG CONVEYOR CHAIN

TISCO drag conveyor chain is noted for its phenomenal wearing qualities and is used for the horizontal transfer of heavy stone, cement, chemicals, etc.

DRAG LINE CHAIN

Embodying exceptional hardness and extremely long-wearing properties. TISCO drag line chain is designed to provide full bearing between links and outlasts others by 500%.

DETACHABLE CHAIN

Used for light and moderate speed drums, conveyors and elevators, TISCO detachable chains are simple to assemble yet cannot become uncoupled while in service. For details on all TISCO manganese steel chains contact:

TAYLOR-WHARTON CO.

DIVISION OF HARSCO CORPORATION

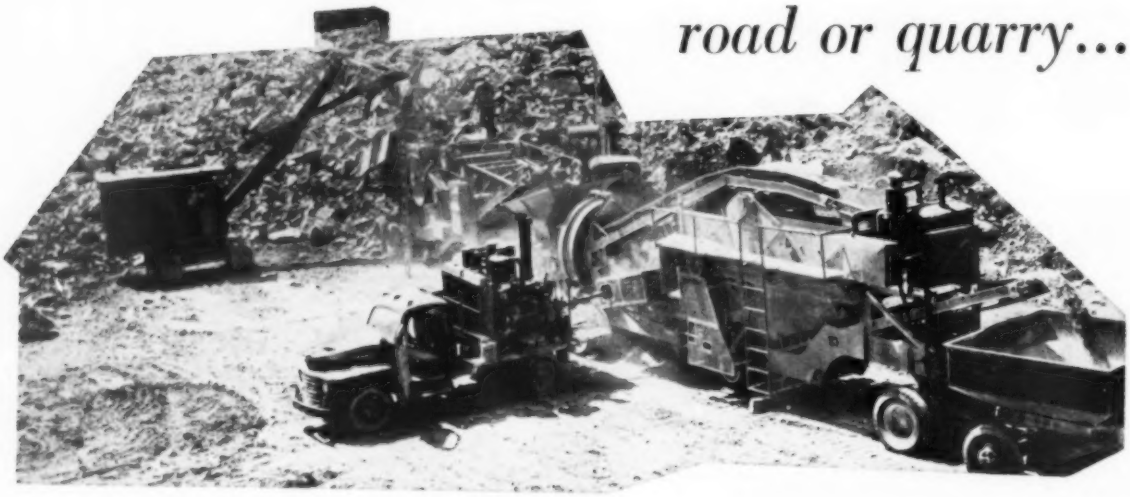
Established 1742

HIGH BRIDGE 3, NEW JERSEY

PLANTS: Cincinnati, O. — Birmingham, Ala. — Easton, Pa.

SALES OFFICES: New York — Chicago — San Francisco

road or quarry...



GOOD COMMUNITY RELATIONS

... because of "good-will" methods and techniques in blasting

Modern blasting presents many problems to the roadbuilder and quarry operator. In addition to doing the job efficiently, he must take the utmost care and consideration to avoid disrupting the business and family life of the community.

To help you increase your standing as a good neighbor and build your professional prestige in the communities where you operate, American Cyanamid Company's engineers have developed blasting procedures that we call "Good-Will" techniques. These techniques can help you reduce noise, vibration and shock to a minimum. At the same time, they enable you to obtain maximum blasting efficiency.

American Cyanamid's trained engineers will be glad to assist you in the selection and most efficient use of our high-grade blasting materials. Their skilled advice and knowledge of all types of blasting are among the many services Cyanamid provides for its customers.

We can give you quick delivery, direct to your location, from our conveniently located plants and magazines. We are always ready to assist you with your unusual blasting problems.

THE AMERICAN CYANAMID LINE:

High Explosives
Permissibles
Blasting Powder
Blasting Caps
Electric Blasting Caps
Instantaneous
Regular Delay
Split-Second Delay
Blasting Accessories

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TOUGH
MULTI-WALLS

SINCE 1885

PERCY KENT BAG COMPANY, INC.

KANSAS CITY · Humboldt 3-9800

BUFFALO · NEW YORK

GAS CLEANING NEWS

Top Cement Producer Orders Four More Koppers Electrostatic Precipitators for Gas Cleaning

Leading Company has ordered 8 Koppers Electrostatic Precipitators since 1950

KOPPERS Electrostatic Precipitators have provided such excellent service that this leading cement producer ordered seven additional Koppers units during the last six years.

Proves Performance on the Job

The company ordered its first Koppers Electrostatic Precipitator in 1950. Its operation was so successful that Koppers Units now collect dust in both East Coast and Gulf Coast plants. These Koppers units have proved economical and efficient because Koppers engineers were able to meet the exacting requirements of each application.

Supplies a Wide Range

These Koppers Electrostatic Precipitators range in capacity from 75,000 CFM to 132,000 CFM. And each Koppers unit has exceeded its guaranteed performance. Engineering know-how enables Koppers to economically satisfy each individual application.

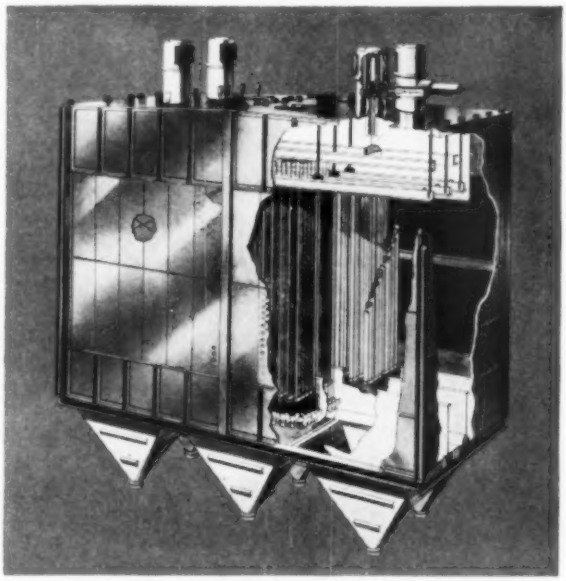
Meets Individual Plant Needs

Koppers custom-designs Electrostatic Precipitators for cement and other dry dust applications: cleaning rotary or vertical kilns, calcining kettle stack gas, collecting dust for re-use, cleaning gases from finishing and raw mill operations. Koppers tailors a power unit by one of three methods to fit specific needs and can also integrate an automatic power regulator into the overall design.

Backed by Know-How

Koppers has over 75 years' experience in industrial gas cleaning. In addition, Koppers maintains extensive research facilities at Verona, Pa., and Baltimore, Md. Manufacturing facilities at Baltimore produce gas cleaning equipment for every size and type of plant.

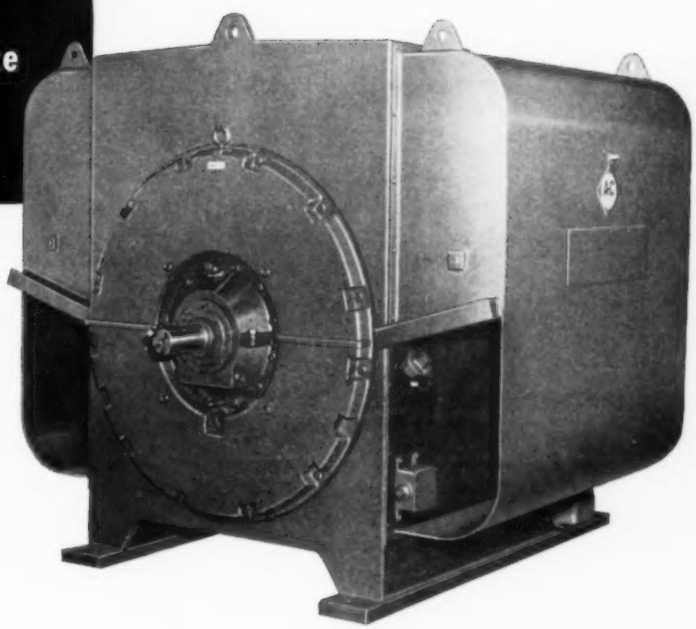
You can put all of this experience and equipment to work solving your gas cleaning problems. Just write KOPPERS COMPANY, INC., Metal Products Division, Industrial Gas Cleaning Dept., 4507 Scott Street, Baltimore 3, Maryland.



Cutaway photo of a Koppers Electrostatic Precipitator shows shell, vibrators, and collecting and discharge electrodes. The actual design and arrangement of elements vary widely because Koppers Electrostatic Precipitators are custom-designed to fit requirements of each particular installation.

Eliminate costly enclosures with Allis-Chalmers weather-protected MOTORS

Modern features cut operating, maintenance expense . . . give MORE dependability



Here's a newly designed line of Allis-Chalmers weather-protected motors with the ability to "take" outdoor conditions. This means no expensive protective enclosures are needed . . . a big saving in plant or installation building costs.

Designed to meet defined NEMA requirements, these motors incorporate many important features which assure dependable outdoor operation:

- **Ventilating System** — Low velocity intake, vertical lift, change of direction and high velocity discharge of ventilating air keep rain, snow, sleet, dust and dirt out of vital parts.
- **Removable Air Ducts** — To facilitate inspection and maintenance of interior air passages, air intake ducts are designed for quick removal.
- **Stator Assembly** — Removable as a unit, it simplifies maintenance and minimizes downtime.
- **Split Sleeve Bearings** — Capsulized design permits access to motor interior without disturbing the bearings or their enclosures. Positive vapor seal is used on high-speed motors. Antifriction bearings are available for slow speed motors.
- **Proven Insulation** — Famous Allis-Chalmers insulation systems (Class A and B) are available. And, for extreme temperatures, or where high resistancé to abrasion and moisture is required, Allis-Chalmers can provide the revolutionary *Silco-Flex* system.

Silco-Flex is an Allis-Chalmers trademark.

THIS DESIGN available in ratings from 250 to 900 hp. Other designs in larger horsepower ratings are also available. Contact your A-C sales office or write Allis-Chalmers, General Products Division, Milwaukee 1, Wisconsin. Ask for Bulletins 51B8606A and 05B7894.

A-5292

ALLIS-CHALMERS

HIGH IN

P&H

ELECTRICS

ARE WORKING FOR SOUTHERN PERU COPPER

In their operations as high as 13000 feet in the Peruvian Andes at Toquepala, Peru, Southern Peru Copper is using P&H Electric Shovels. Their maximum availability and minimum maintenance are vital to high production. In addition to 10 P&H Model 1800 machines, Southern Peru Copper has purchased 23 P&H diesel powered excavators.

Only P&H Electric Shovels have these outstanding exclusive features.

MAGNETORQUE®. . . the electro-magnetic type coupling that transmits power from the hoist motor to the dipper for faster action, eliminating shock and impact to the hoist gear train and motor. Response is immediate to varying load conditions.

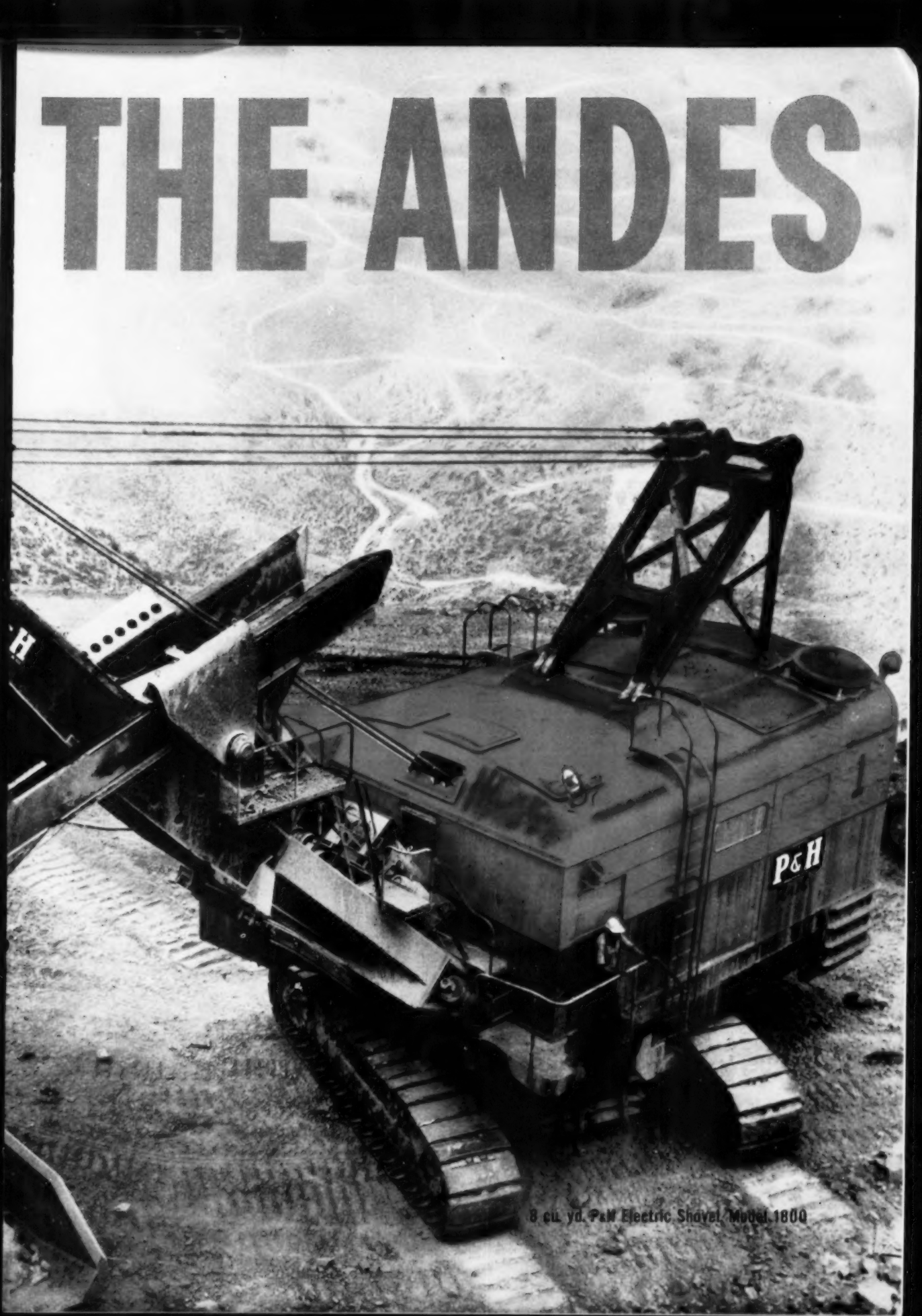
ELECTRONIC CONTROLS . . . providing the fastest action of any type of control available on electric shovels. All motions are smoother, resulting in consistently higher output.

Whether it's big P&H Electric Shovels from 3½ through 8 cu. yds., or smaller P&H excavators, it will pay you to choose from the P&H complete line. P&H offers single source responsibility for all your open pit mining needs.

HARNISCHFEGER

CONSTRUCTION & MINING DIVISION
Milwaukee 46, Wisconsin

THE ANDES



8 cu. yd. P&H Electric Shovel, Model 1800

CUTS TIRE DOWNTIME COSTS ON QUARRY JOBS

We're specialists at "CAROLINA" in recapping tires worn treadless by quarry or other earthmoving work. Our service *doubles* tire life—at only *half* the new tire cost!

We have saved thousands of dollars a year for the W. E. Graham Construction Co. of Maryland—they state that CAROLINA recaps run as long as new tires.

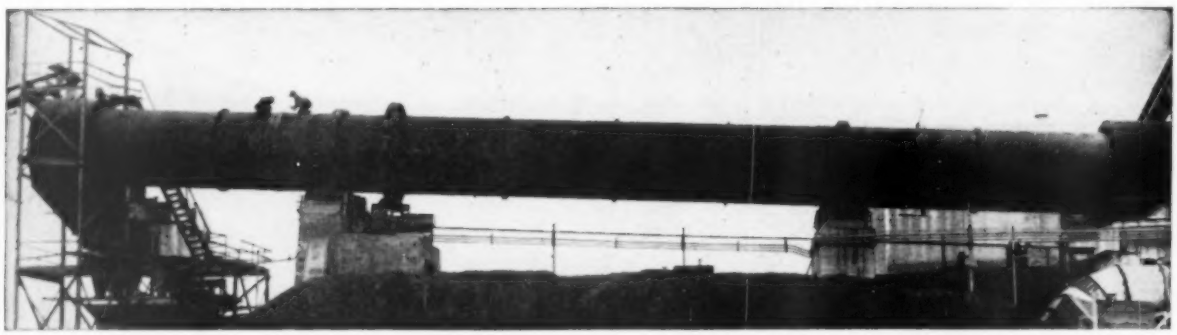
Got "big tire" troubles? Consult any of the more than 2000 "CAROLINA" service dealers in 30 states and some foreign countries.

WE GO ANYWHERE, ANYTIME . . .

for Pickup and Delivery. Expert on-the-job service available.

Write TODAY for full details

CAROLINA TIRE COMPANY · 232 N. Main St., Salisbury, N. C.



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We design and manufacture

ROTARY KILNS
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DRYERS
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COOLERS
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LIME HYDRATORS
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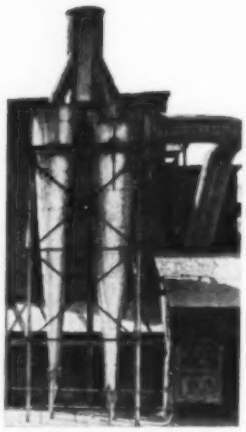
DUST COLLECTORS

and design the plants in connection with the same.



NEW HIGH EFFICIENCY DUST COLLECTOR

7'x60' CLAY DRYER INSTALLED IN HENDERSONVILLE, N. C.

W. P. HEINEKEN, INC.

ENGINEERS MANUFACTURERS

50 BROAD STREET • NEW YORK 4, N. Y.

Put your haulage requirements in experienced hands...

... the **SURE** hands of experience which have specialized in the manufacture of heavy duty trucks for over 53 years. Model 35SL (shown above) carries 35 tons (24 cubic yards, struck). 400 HP Diesel with down-hill retarding hydraulic torque converter. DART-designed-and-built 50,000 lb. front axle and 110,000 lb. capacity drive axle and DART'S famous box girder frame give this truck superior strength.

Model 10SL. DART'S Jr. Workhorse. 10 ton capacity, powered by 150 H. P. diesel driving through a double reduction rear axle. Tires are 12.00 x 20 all around. Hydraulic steering and torque converter, optional.

Model 25SL. The famous DART standard dump truck. 300-335 H. P. diesel engine and hydraulic torque converter with built-in down-hill retarding. Hydraulic power steering. Known and used the world over.

Model 50T. Payload of 50 tons (30 cubic yards, struck). 400 H. P. and hydraulic torque converter with built-in down-hill retarding Heavy-duty 4-speed transmission. Hydraulic Power Steering.

POWER for the Climb — *SPEED* for the Haul Road

HEAVY DUTY TRUCKS EXCLUSIVELY SINCE 1903

DART TONNAGE ENGINEERED TRUCKS

Kansas City 8, Missouri

SUBSIDIARY OF THE CARLISLE CORPORATION

D-130

"We're blasting near you"

Now you can gain better public relations in communities where you are blasting by showing an interesting, informative film, in color!

It works, too. The film, entitled, "*We're Blasting Near You*" has already been shown by contractors and quarry operators in many parts of the country, to audiences including PTA groups, civic organizations and service clubs.

The movie tells why blasting is necessary, and explains the steps you are taking to "be a good neighbor." It shows how millisecond delay techniques eliminate the old-fashioned, jarring explosions of the past, and how modern blasting methods keep noise, vibration and flying rock to a minimum.

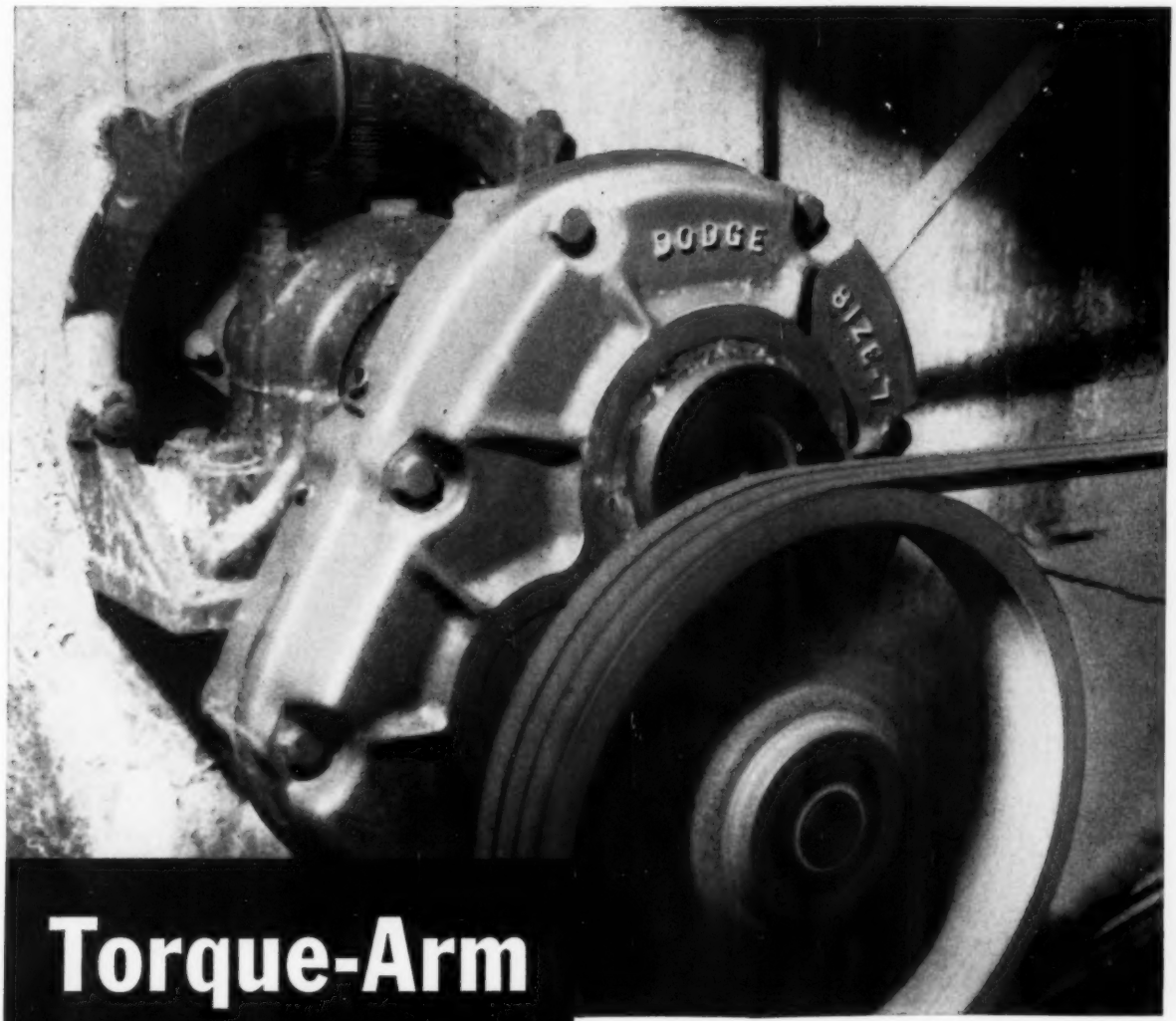
This unique film is accompanied by a kit of suggested news releases, sample speeches, safety posters and other helpful material—everything you need to conduct a successful meeting in your community. Plan now to get the important public relations benefits from showing "*We're Blasting Near You.*" Write, telling us the approximate dates you'd like to schedule it.

Technical Customer Service Section

ATLAS POWDER COMPANY

WILMINGTON 99, DELAWARE

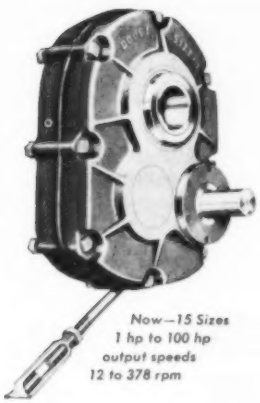
offices in principal cities



Torque-Arm

SHAFT-MOUNTED SPEED REDUCERS

Save Up to 1/3 in Installation —Deliver 97% Efficiency!



Now—15 Sizes
1 hp to 100 hp
output speeds
12 to 378 rpm

Easy to install! Mounted directly on the driven shaft. Locked at both ends. Dodge Torque-Arm Speed Reducer requires no foundation, no flexible coupling, no sliding base, and there's no lining-up problem. Amazing economy is matched by efficiency in operation—up to 97%.

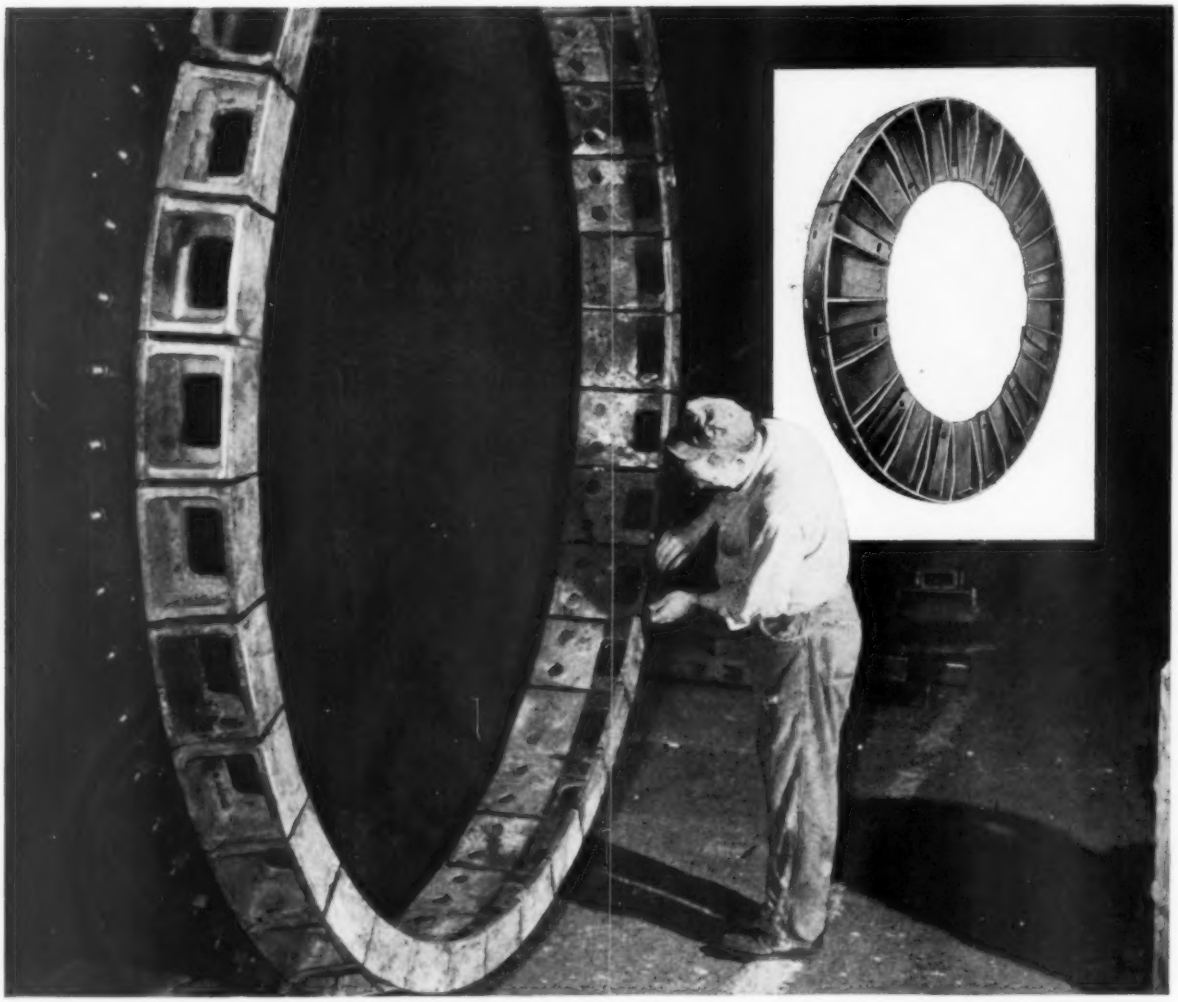
Unit is driven through V-belt drive. Stock Taper-Lock Sheaves prescribed for each job permit speed ratios required. Tri-Matic Overload Release and backstop available, if desired. Dodge Torque-Arm is America's most complete line of shaft-mounted Speed Reducers. Ask your Dodge Distributor—or write us.

•

DODGE MANUFACTURING CORPORATION
4000 Union Street, Mishawaka, Indiana

CALL THE TRANSMISSIONEER, your local Dodge Distributor. Factory trained by Dodge, he can give you valuable assistance on new methods. Look for his name under "Power Transmission Machinery" in the yellow pages of your phone book—or write us.

DODGE
of Mishawaka, Ind.



IN CEMENT, LIME, AND DOLOMITE PLANTS...

B&W Nose and Tail-Ring Castings Demonstrate Longer Continuous Service

Longer brick life and longer continuous service are being attained by 275 kilns in 54 plants using B&W Nose and Tail-Ring Castings. In many cases, the life of these castings has exceeded 9 years.

Light and strong B&W Alloy Castings have improved kiln performance in most installations. Made of heat-resisting Grade HH alloy, nose ring castings eliminate belling out of the kiln shell, assuring longer brick life and longer continuous operation of the kiln. By protecting the end of the kiln shell from direct flame, the nose ring castings prevent "feathering-down" of the shell because of oxidation. Their design eliminates cracking and warping, experienced with large size castings.

Small size and light weight make B&W Castings easy and inexpensive to install. The protecting flange on the nose ring castings permits the use of low-alloy steel bolts for fastening.

Spare part inventory may be kept low because the same nose ring castings may be used on kilns varying up to 4 feet in diameter, depending upon size. Write for Bulletin S-17. The Babcock & Wilcox Company, Process Equipment Department, Barberton, Ohio.

S-467

BABCOCK & WILCOX

BOILER DIVISION

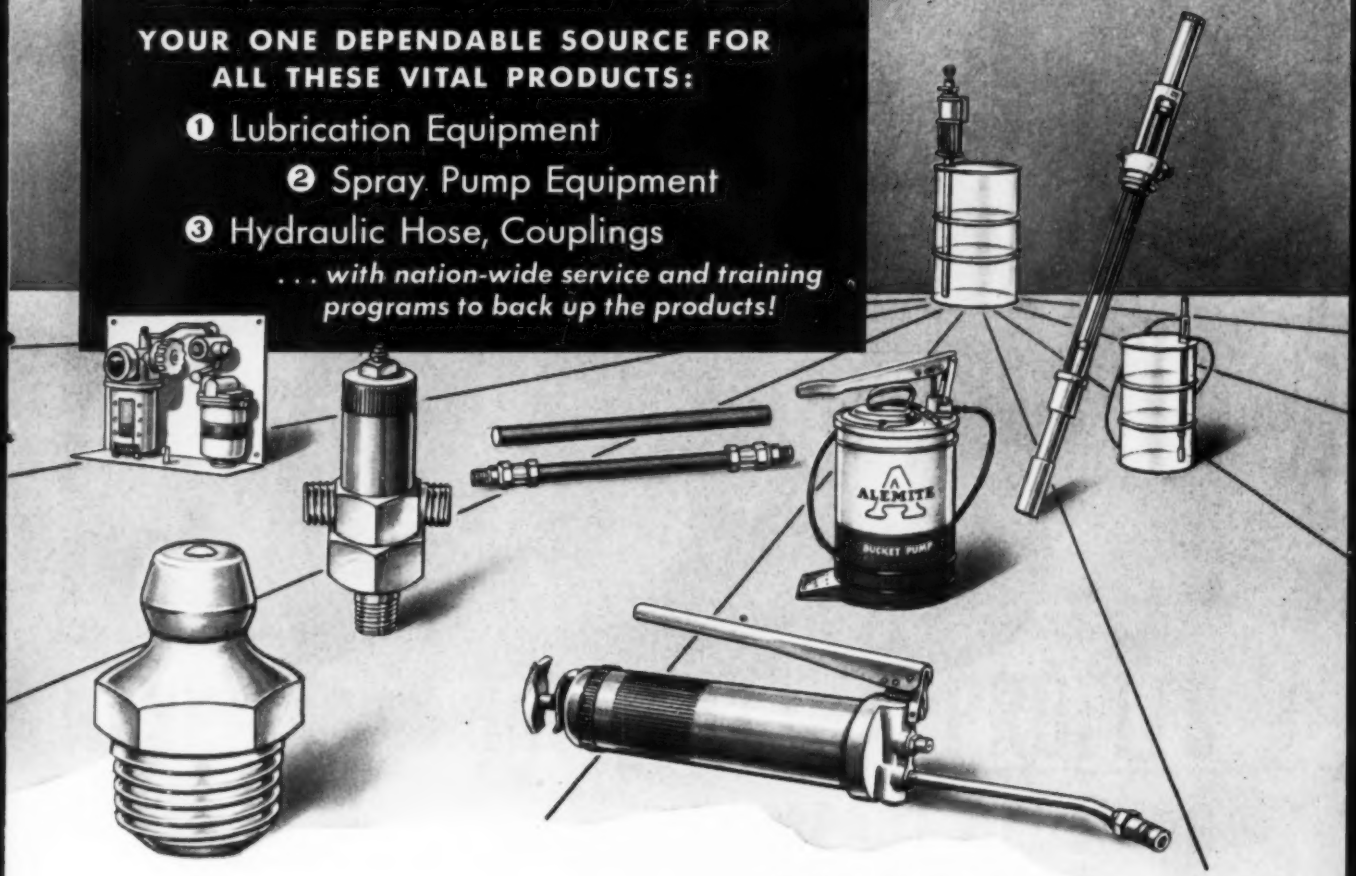
MORE THAN THE LUBRICATION LEADER . . .

ALEMITE®

YOUR ONE DEPENDABLE SOURCE FOR ALL THESE VITAL PRODUCTS:

1. Lubrication Equipment
2. Spray Pump Equipment
3. Hydraulic Hose, Couplings

. . . with nation-wide service and training programs to back up the products!



Cut Lubrication Costs up to 64%! Alemite offers the widest choice of lubrication fittings on the market—time-saving pumps and guns for handling of lubricants—fully automatic airborne mist lubrications systems—centralized systems for both oil and grease.

Apply Materials 30% Faster!—If you use any material that is received in a drum—paint, putty, caulking, even food products . . . Alemite can pump direct from the drum to point of application for spraying, extruding, transfering, packaging!

Protect Hydraulic Systems!—Alemite offers a complete line of non-skive, reusable high pressure hose and couplings for *any* hydraulic system.

And Alemite backs up these products with service points from coast to coast—with free training programs and plant surveys that will save money for *your* company!

For free catalogs and complete information, write Alemite, Dept. L-77, 1850 Diversey Parkway, Chicago 14, Ill.

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Alemite is the only *single source* for all these famous products:

OIL-MIST	Automatic Airborne Lubrication System
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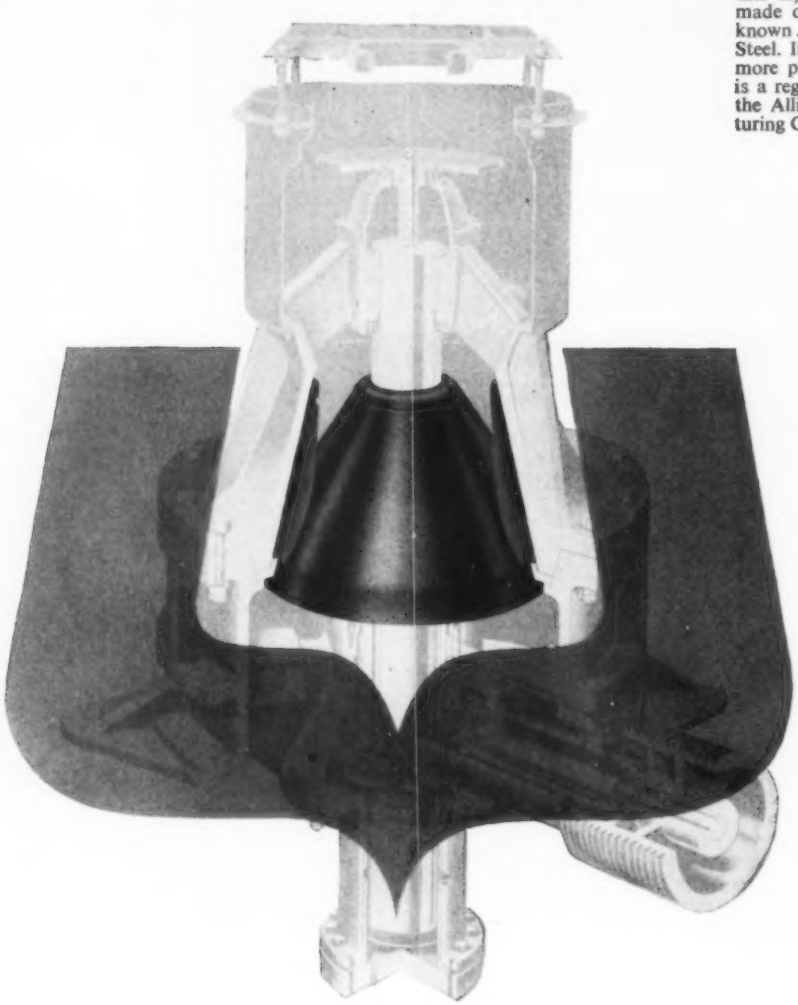
red•ball	Hydraulic Lubrication Fittings
Barrel Pumps for Oil and Grease	"POWERHOUSE"
"BARREL-TO-BEARING"	Manual and Power Operated Pumps and Guns
Spray Pump Equipment	ALEMITE Versatal
SURGEPRUF	Hydraulic Hose and Couplings



Concave ring and mantle of this *Hydrocone* crusher are made of the toughest steel known . . . Amsco Manganese Steel. It *gives* a little, to take more punishment. *Hydrocone* is a registered trade-mark of the Allis-Chalmers Manufacturing Company.

How a little give adds a lot of life to AMSCO CRUSHER PARTS

Both mantle and concave ring crush a lot more feed because of certain properties of Amsco® Manganese Steel. The metal *gives* a little under crushing forces, absorbs stresses, resists cracking and chipping. Yet these same forces work-harden the surface of Amsco Manganese Steel to as much as 500 Brinell . . . a high hardness, stubborn to wear.

Amsco Manganese Steel Crusher Parts maintain their ductile undersurface and work-hardened surface even when worn thin. That's why Amsco parts endure severe abuse for so many work hours without letup.

To be sure of getting Amsco Manganese Steel, order replacement parts from your crusher manufacturer. Amsco makes manganese steel parts for most manufacturers of crushing, grinding and pulverizing equipment.

Amsco also produces other alloy steels with maximum wear resistance under particular service conditions

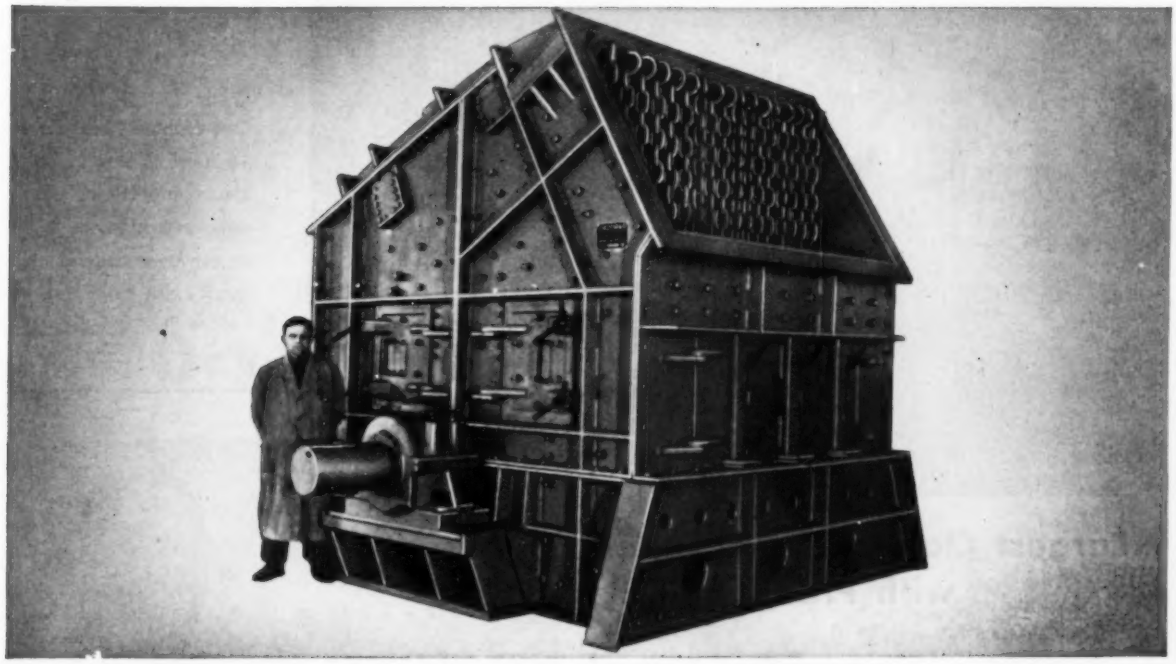
AMERICAN Brake Shoe COMPANY

AMSCO

American Manganese Steel Division • Chicago Heights, Ill.

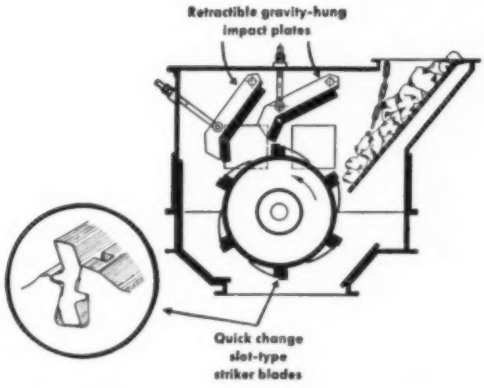
OTHER PLANTS IN: DENVER, LOS ANGELES, NEW CASTLE, DEL., OAKLAND, CAL., ST. LOUIS, JOLIETTE, QUEBEC

IMPACT CRUSHER—"5 WAYS BETTER!"



Shown in photograph: HAZEMAG Impact Crusher, Model #AP5BR. Rated Capacity: up to 500 tons per hour.

HAZEMAG BRINGS EXTRA PROFITS



with IMPACT CRUSHING

NOTE THESE PLUS VALUES

1. HAZEMAG OFFERS A WIDER CRUSHING RANGE—from ballast to base course fines, with product sizes from 2"-3" to 0"-¼".
2. SUPERIOR PRODUCT—Cubical in shape, flats eliminated.
3. HAZEMAG'S SPECIAL FINENESS CONTROL delivers sized product, minimizing the recrushing and blending required.
4. NEW TECHNICAL DEVELOPMENTS have greatly lowered impactor wear cost to a few cents per ton of through put.
5. HAZEMAG IMPACTOR produces to accurate and most exacting aggregate specifications at biggest profit levels ever achieved.

OVER ~~1200~~ 1700 HAZEMAG IMPACT CRUSHERS NOW INSTALLED ALL OVER THE WORLD

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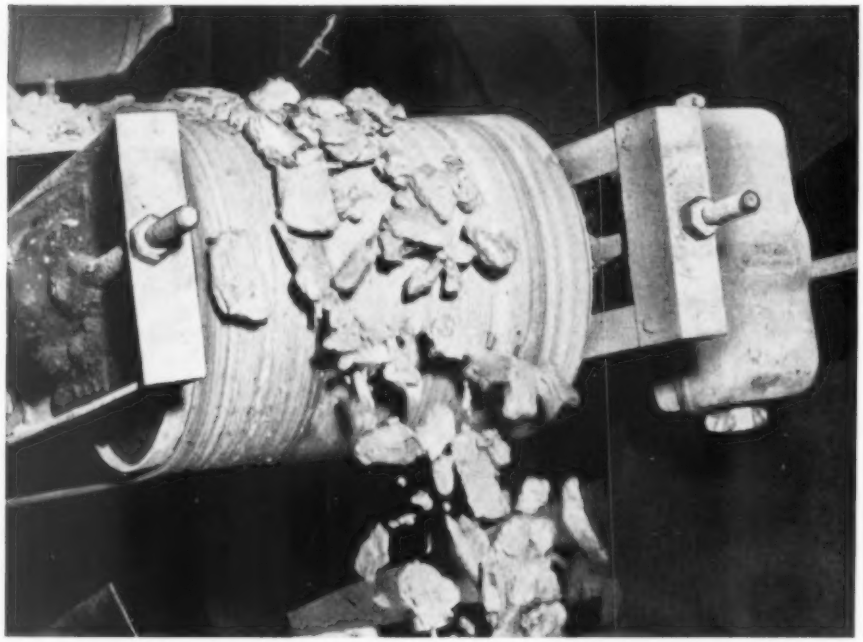

One of three 12-in.-dia. by 16-in.-width Stearns electromagnetic pulleys removes tramp iron as conveyor delivers high-quality clay to hopper before final processing.

Largest Clay Producer Takes No Chances with Product Purity...

Stearns Magnetic Pulleys Remove Tramp Iron from Ceramic Clay

CHESTER GULICK, *Manager*
Kentucky-Tennessee Clay Co., Inc.

Operating 'round the clock, three Stearns electromagnetic pulleys effectively remove traces of free iron from 300 tons of ball clay daily at Kentucky-Tennessee Clay Company, Inc. Located near Mayfield, Kentucky, the firm is the nation's largest producer of ball clays used in the manufacture of hotel china, art novelties, ceramic tile and sanitary ware.

The Stearns pulleys extract tiny amounts of tramp iron from disintegrated clay prior to grinding and air flotation. Complete and positive removal is important not only for product quality but also for protection of costly processing machinery. Says Manager Chester Gulick, "The Stearns magnetic pulleys enable us to provide customers with a much cleaner finished product than would be possible without such protection.

"Since we installed the Stearns pulleys in 1941, they have done an outstanding, trouble-free job of tramp iron removal. Maintenance has been normal, with no appreciable downtime."

This 16-year record of efficient performance is typical of Stearns equipment in hundreds of processing installations. The Stearns line of *engineered* magnetic pulleys is complete — electromagnetic or permanent types, full range of standard widths and diameters. You can easily select the ideal unit for your application. Call your Stearns representative for details, or write for free literature.

46

SEND FOR THESE HELPFUL BOOKLETS

	Bulletin No.
Permanent Magnetic Pulleys - - -	350-CN
Electromagnetic Pulleys - - - -	303-DN

STEARNS MAGNETIC PRODUCTS

635 SOUTH 28TH STREET • MILWAUKEE 46, WISCONSIN

don't lose your head!

When bearings fail, don't go to pieces... get on the phone and tell an authorized SKF distributor your troubles. He will help you put things back in order, quickly. Every authorized SKF distributor carries a complete line of SKF ball and roller bearings and pillow blocks — a type for every use — and he is factory-trained by SKF to assist you on any knotty production problems.

Call him for prompt, reliable service on all bearing requirements.

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SKF®

BEARING REPLACEMENT SERVICE

SKF INDUSTRIES, INC., PHILADELPHIA 32, PA.

*Reg. U.S. Pat. Off. Tyson Bearing Corporation

Fast 2½-yd. Manitowoc Model 3500 shovel loads over 100 20-ton truck loads of limestone a day for well-known Illinois cement producer.

Plant output depends on your shovel . . .

that's why . . .

Manitowoc pays off in the pit!

The shovel in your pit is a primary producer with plant production closely geared to its output. That's why you need a real rock shovel — one that can consistently put out the necessary tonnage to keep your plant operating at top efficiency.

Manitowocs fulfill every requirement for rugged quarry service — smooth, steady power flow; fast cycle speed; and the work capacity to load out rock on a round-the-shift schedule.

Simple design throughout channels all useable horsepower directly to the dipper — provides greater line pull for an added margin of power. Disc-type swing and travel clutches assure smooth, precise performance without jerking or grabbing. Underslung dipper sticks mesh firmly against drive pinions due to upward pressure when digging . . . Sticks slide through saddle blocks on four adjustable rollers to eliminate wasted power. Extra-heavy construction of the wide-spread crawler base and massive carbody give every Manitowoc a solid foundation for the toughest digging.

These are only a few of the reasons why you see more and more Manitowocs in quarries everywhere. For added facts and figures on the entire profitable line, call your Manitowoc distributor *now*.

ADDS POWER BY SAVING POWER
Only Manitowoc gives you a unique "Slide Pinion" arrangement which effectively reduces the number of gears and pinions needed in the main machinery. Eliminates power loss through unused gear trains — directs full power flow to the operating function.

TORQUE CONVERTER REDUCES PEAK LOADS
Here's smooth power delivery of twice normal torque with maximum engine efficiency at all times. Eliminates peak loads throughout gear train due to quick drum speed changes — extends cable life—reduces machine downtime.

STAYS ON THE JOB LONGER
Manitowoc gives you extra years of big yardage production — lower maintenance cost. Enclosed gears run in oil; there are fewer wearing parts — fewer replacement of parts; balanced design evenly distributes digging stress.

Manitowoc

SHOVELS 1-5½ YD. • CRANES 20-100 TON

MANITOWOC ENGINEERING CORP.
Manitowoc, Wisconsin

GET HIGH QUALITY AGGREGATE
from low grade sources

WEMCO HMS (Heavy Media Separation) can remove deleterious material such as shale, chert, soft-stone, wood and coal from low grade deposits. The finished product is specification aggregate universally accepted for concrete that must stand up under severe outside exposure. The cost of HMS treatment can be far less than the transporting of material from more distant sources.

A POSITIVE SEPARATION BY PARTICLE DENSITY ALONE

HMS will work wherever there is a known difference in specific gravity between deleterious material and the desired gravel. It floats one and sinks the other. The separating medium is a suspension of fine magnetic particles in water. It can be adjusted to any needed specific gravity. Make-up costs are only two to six cents per ton of aggregate.

WEMCO MOBIL-MILLS ARE YOUR INDUSTRY'S CHOICE

To date every HMS user in the sand and gravel industry has chosen the Wemco Mobil-Mill. It is a complete plant — pre-engineered — pre-fabricated — and of pre-determined cost. It is so thoroughly proven in design that it operates from the first day. It goes up in minimum time and at minimum cost. Then it knocks down and moves on when the deposit is exhausted. The Wemco HMS Mobil-Mill is available in capacities from 5 to 500 tons per hour.

Write today for further information

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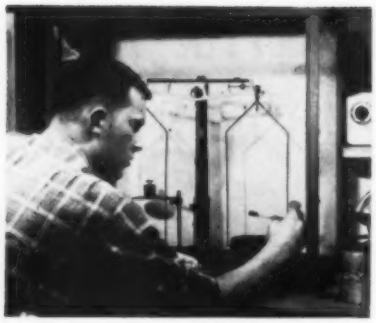
Representatives in principal cities of the United States and Canada and in major countries throughout the world.

Links in the chain of quality control at Moline...

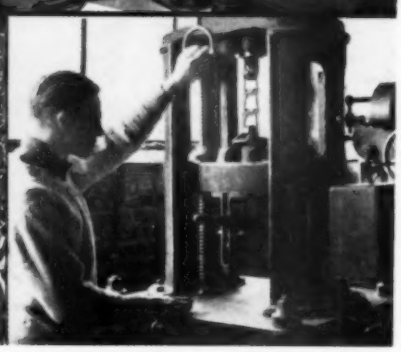


Testing the sand for moisture control and screen analysis are the first steps in Moline's rigid quality control system scales.

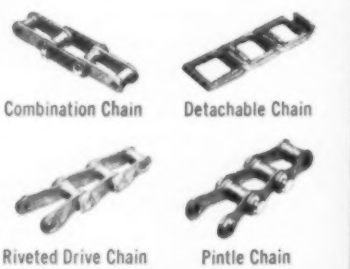
Charting the sand test for permeability and green compression strength maintains strict Moline standards for finest finishes and tolerance.

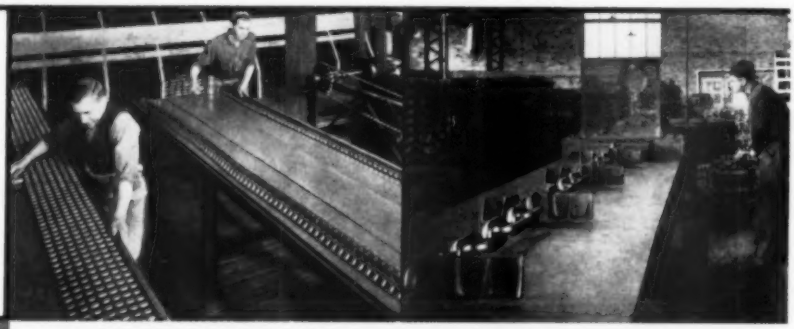
Analyzing the iron for rigid control over carbon, silicon, manganese, sulphur, and phosphorus.

Gauging link by link and visual inspections to hold minimum tolerance is a test done exclusively by Moline.



Physical testing of links from each days production insures Moline's high standards for yield and tensile strengths.





Pitch testing of assembled chains includes limbering over sprockets and stress testing for strength and soundness.

Shock testing by critical inspectors means stressing each chain to proof strength and shock tested with hammers.

Moline CONVEYER **Chains**

LEADER FOR 60 YEARS

MOLINE MALLEABLE IRON COMPANY

St. Charles, Illinois

Specialists in the manufacture of chains

For Conveying, Elevating and Power Transmission

NOW...

. . . higher capacity wet screening in the 8-48 mesh range with

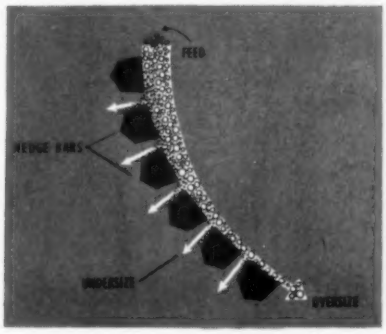
The Dorr-Oliver DSM Screen

The latest and one of the most significant advances in the Dorr-Oliver line of classification equipment is the Dorr-Oliver DSM Screen . . . developed for the high capacity wet screening of coal in the 8-48 mesh range.

Capable of handling exceptionally large flow volumes, the DSM Screen will effect separations at capacities greatly in excess of other units now operating in this size range. The compact and economical stationary design requires very little floor space . . . no special support required other than that for piping. Installation and operating costs are low . . . no moving parts result in minimum maintenance.

Available in four standard sizes from 1 to 4 ft. in width the DSM Screen can provide from 200 gpm of 48 mesh undersize per ft. width to 500 gpm of 8 mesh undersize per ft. width.

For more information on this newest tool for the mining industries, write for a copy of Bulletin No. 2300. Dorr-Oliver Incorporated, Stamford, Connecticut.



Illustrative drawing showing principle of separation

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Roebling Royal Blue Wire Rope will take **shock** after **shock** after **shock!**

This, and the fact that Royal Blue is stronger than the strongest you have been using, has helped to make it the most widely favored rope in Roebling's history. It will work hard and last longer on *your* job. Your distributor or Roebling Sales Office will give you full information, or write: John A. Roebling's Sons Corporation, Trenton 2, New Jersey.

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Distributors, Branches and Warehouses Throughout the Country
Subsidiary of The Colorado Fuel and Iron Corporation

Let Armco Pipe lower your hydraulic material handling costs

Armco Special Analysis Pipe, 14-inch diameter, .250-inch wall thickness, 1200 feet long, carries an abrasive mixture from the dredge to the processing plant at McGrath Sand and Gravel Co.'s plant in Chillicothe, Illinois.

Armco Special Analysis Steel Pipe offers advantages that can save you money in mining, dredging, and wherever else you need dependable pipe for hydraulic handling of materials.

Low cost per cubic yard of material handled

High strength and ductility, combined with the excellent abrasion resistance of Armco Pipe, assure long service life, keep costs down.

20 different diameters from 6 to 36 inches

You can get *exactly* the hydraulic capacity you want. There's no need to compromise on the "closest available size."

Wall thicknesses from $\frac{9}{64}$ to $\frac{1}{2}$-inch

Armco's exceptionally wide range of wall thicknesses makes it possible for you to buy for specific requirements. You don't pay for more metal than you need.

Lengths up to 50 feet

Armco Pipe is supplied in any length up to 50 feet. Long lengths mean fewer joints; quick, low-cost installation.

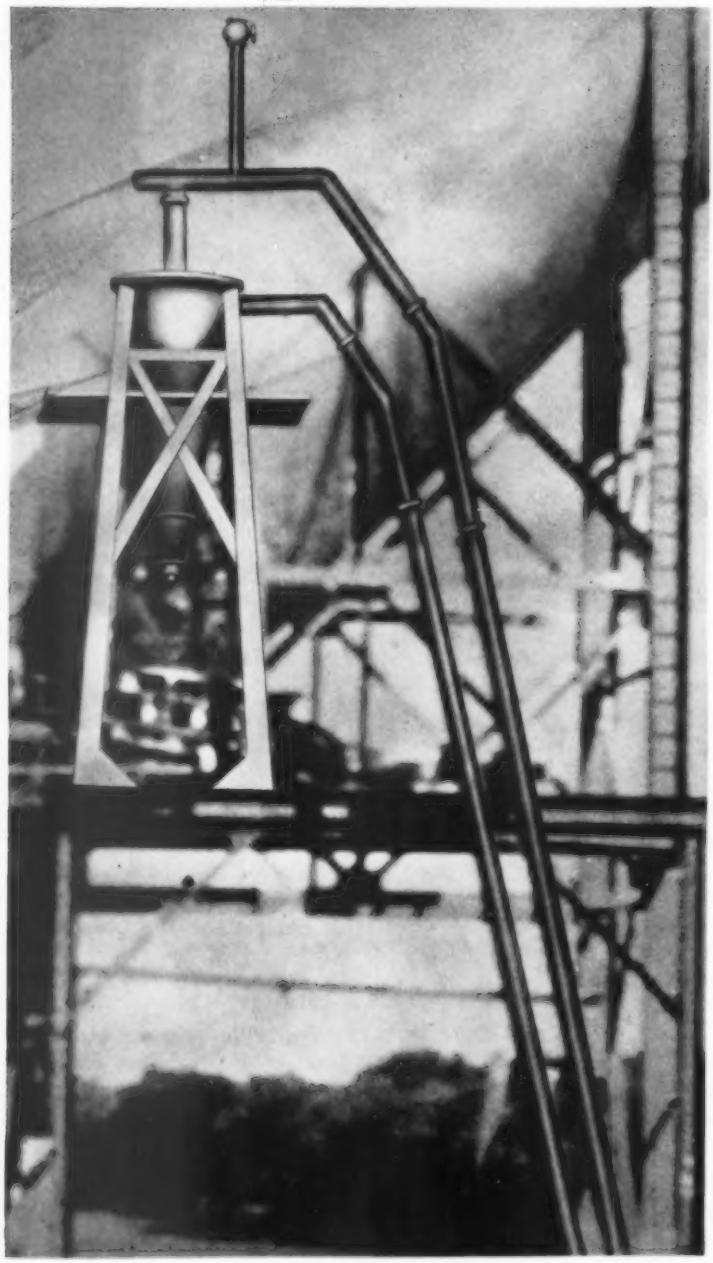
Variety of joints and end finishes

Armco Pipe can be supplied with flanges or with machine reduced or expanded ends. Pipe ends can also be prepared for mechanical couplings or welding. Other special end finishes are available.

Write for information applied to your needs. Armco Drainage & Metal Products, Inc., Welded Pipe Sales Division, 5217 Curtis Street, Middletown, Ohio. Subsidiary of Armco Steel Corporation.

Armco Special Analysis Steel Pipe

45-in. Duraclone—by Itself—Completely Processes 150 Tons of Silica Sand Hourly



CLASSIFIES, CLEANS AND DEWATERS READY FOR SHIPMENT AT AN EXTREMELY LOW COST

• A 45-in. DURACLONE, without any other equipment whatsoever . . . neither drags, screws nor screens, is making sand-processing history at the Dick Arthur Project at Selkirk, Manitoba, Canada.

• Pumping a minus 10-mesh pit-run slurry (32% moisture) to the 8-in. inlet of the 'king-size' rubber-lined DURACLONE, the clean underflow is discharged direct to gondola cars or is conveyed to storage in stockpile. All deleterious matter, including fine iron oxides and alumina which are undesired in glass manufacture, etc., is piped away to waste from the DURACLONE overflow. Moisture content as discharged has averaged 16% with the expectation that this would be further reduced as the 1957 operating season began.

• Average output of market-grade sand is 150 tons per hour. Preliminary figures, including overall operating expense and amortization of the installation on a 5-year basis, indicate a processing cost of less than 10 cents per ton of dry-weight finished sand!

• DURACLONE can do a complete sand processing job in your plant or, in smaller diameter models, will quickly pay for itself in the specification fines it recovers from remnants in conventional classifier wastes. Completely rubber-lined for long life, DURACLONES are sold on a guaranteed performance basis when installed as directed.

• Investigate DURACLONE! Write or wire today, stating g.p.m. to be handled.

DURACLONE

H. B. Large Engineering Co. • 262 S. Parkwood Ave. • Pasadena, Calif.

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Closing date:

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PIT & QUARRY
431 S. Dearborn St. Chicago 5, Ill.

BROADCAST *Section*

WANTED

Plant Superintendent for Sand & Gravel Producer. Dredge operation and shipping facilities. State starting salary and experience.

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QUARTZITE QUARRY FOR SALE

156 acres of an unlimited deposit of a high grade, highly refractory quartzite with an additional 11 acres of tracksite property, located in the South Central part of Wisconsin. Quarry fully developed and ready for operation. Have market for good size tonnage for all year round shipments Here is a real opportunity for a capable party who has the necessary equipment for crushing and screening.

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New, in original packing case, Model 1R—40, complete with shank and bit punch, shanking devices, dies, dollies, punch pins and various other parts. Priced at approximate half of present cost. Packed for export.

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Two 8′ x 125″ Kilns for immediate Installation.

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Excellent opportunity for college graduate, mechanical or mining engineer preferred, with several years of experience in the design and application of crushers and other types of machinery for mines, quarries and gravel plants, and with engineering department administrative experience.

Salary commensurate with ability and opportunity for right man to become part of management team.

Excellent working conditions in very modern plant with brand new air conditioned offices located close to best Milwaukee suburban residential areas.

Give age and complete outline of education and experience. Replies kept confidential.

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READY MIX CONCRETE
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1956 SALES
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Crushed stone quarry 100 miles south of San Francisco. App. 70 employees. Write, giving complete details of experience, education and salaries earned. Confidential.

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SPECIALISTS IN DESIGN OF CRUSHED STONE, SAND, GRAVEL AND READY MIX PLANTS
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1—F. L. SMIDTH ALL WELDED ROTARY KILN, 8′ 2″ x 132′, COMPLETE WITH ALL AUXILIARY EQUIPMENT, 13 YRS. OLD.

1—VULCAN 6′6″ x 100′ ROTARY KILN, COMPLETE WITH AUXILIARY EQUIPMENT.

BOX PQ-6103 c/o PIT & QUARRY PUBLICATIONS
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1 Kent Ring-Roll Crusher type #7 Maxecon Mill, with 6″ double Y feeder, including 40 H.P. Motor and 50.0 8 C sheave, V belt drive. Mill in good condition and can be inspected at Manufacturing Plant in Philadelphia.

BOX PQ-5083 c/o PIT & QUARRY PUBLICATIONS
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WANTED

Good Used 18" & 24" Trough Idlers, any amount.
Late Model Vibrating Screens.
Jaw Crushers, all sizes.
Gearmotors 3 to 15 H.P.

FOR SALE

DIAMOND PORTABLE CRUSHING PLANT, 15x24, PNEUMATICS.
CEDAR RAPIDS 25 YD. SECONDARY PORTABLE CRUSHING PLANT.
Acme 9" x 16" Jaw Crusher.
Acme 14" x 26" Jaw Crusher.
Climax 10x20" Jaw Crusher.
New Universal 3x5 s.d. Screens (2)
New Universal 3x8 s.d. Screen.
New Universal 3½x8 s.d. Screen.
Seco Screen 4' x 8' double deck.
Seco Screen 4' x 14' triple deck.
Revolv. Screen 48" x 20', trunnions.
6" Enclosed Bucket Elevator.
8" Enclosed Bucket Elevator.
75' x 10" Enclosed Elevator.
6" Encl. Perfect Discharge Elevator.
Sandvik Steel Conveyor 30" x 45' with idlers and pulley.
12" x 30' Screw Conveyor.
Trough Idlers 42" & 48", antifriction.
Trough Idlers 36", 5 roll type (69).
New Idlers, 18" and 24".
Plain Bearing Trough Idlers, 5 roll type, 18" and 24".
Misc. Size Large Conveyor Pulleys.
Eriez Perm. Magnetic Pulley 20" x 20".
Jeffrey 35 Cu. Yd. Bin.
15 Ton Stiffleg Derrick, 110' Boom.
Wright 8 Ton Chain Hoist.
Sullivan Elec. Tugger Hoist, 7½ H.P.
Small Gasoline Water Pumps.

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3— 167 KVA W-H 13800-240/480

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Transformers Bought, Sold, Repaired and Rented
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1 Model 8-12" high Columbia Block Machine.
1600 18x18¼" steel pallets
58 racks
18 ft. Stearns skip
Molds for 2-4-6-8-10-12 inch blocks
(This equipment was replaced with a Model 12 Columbia in May 1957)
2 Carpenter 750 gal. capacity septic tank forms and allied equipment
1 GMC Delivery truck for septic tank

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48B Bucyrus Erie Shovel 2 cy Diesel
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Barber-Greene Bucket Loader.
10" x 6'5" Paving Loader Crawlers
38 HP H-217 Buda Engine
GOOD CONDITION

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NEW AND USED . . . MOBILE BEATER TYPE 17 CU. FT. MIXERS POWERED BY 4 CYL. 16.5 H.P. INTERNATIONAL ENGINE. ALL MIXERS HAVE VARIABLE SPEED . . . GOVERNOR CONTROL . . . MIXER PADDLES WITH ½" WIRE MESH . . . GEAR SAFETY RELEASE. VICKERS HYDRAULIC EQUIPMENT. MADE FOR MIXING SPECIAL LIGHTWEIGHT AGGREGATE AND CELULAR CONCRETE. ALL MODELS PRICED BELOW COST . . . WRITE TO:

ELASTIZELL CORP. OF AMERICA

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PHONE 1080

FOR SALE

Raymond 42" Low Side Roller Mill, 3'x28' Dryer W/Ray Oil Burner, Diesel Power units, exhausters, Cyclone & Elevators.
118 KW, AC, 3/60/240V 360 RPM Fairbanks Morse Diesel Generator Sets Two twin units. Good condition.

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MOULDING SAND PREPARATION PLANT

Give all data first letter. State condition, location, price.

Tasa Coal Company
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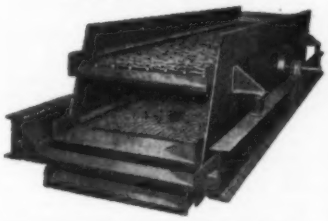
IMMEDIATE SHIPMENT FROM OUR FACTORY - WRITE, WIRE OR PHONE

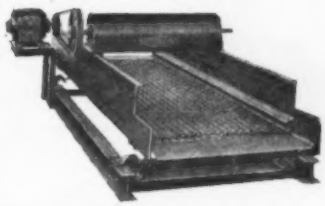
NEW BONDED® HEAVY DUTY VIBRATING SCREENS



Model Number	No. of Decks	Screening Area	Sale Price
124AS	1	2'x4'	$ 443.00
224AS	2	2'x4'	472.00
126AS	1	2'x6'	472.00
226AS	2	2'x6'	501.00
136AS	1	3'x6'	581.00
236AS	2	3'x6'	688.00
336AS	3	3'x6'	956.00
138AS	1	3'x8'	675.00
238AS	2	3'x8'	815.00
338AS	3	3'x8'	996.00
336BS	3	3'x6'	1303.00
436BS	4	3'x6'	1447.00
138BS	1	3'x8'	1231.00
238BS	2	3'x8'	1282.00
338BS	3	3'x8'	1375.00
248BS	2	4'x8'	1865.00
348BS	3	4'x8'	2035.00
2410BS	2	4'x10'	1953.00
3410BS	3	4'x10'	2305.00
2412BS	2	4'x12'	2319.00
3412BS	3	4'x12'	2635.00
4412BS	4	4'x12'	2833.00

HEAVY DUTY MODELS, TYPE BS: Four bearing positive throw eccentric shaft; 3' x 6' to 5' x 14', 1 to 5 decks. Write for New 8-page Bulletin No. 1087.

NEW BONDED® GENERAL DUTY VIBRATING SCREENS



GENERAL DUTY SCREENS, TYPE AS: Eccentric weight mechanism, spring mounted, 1 to 3 decks, 2' x 4' to 3' x 8'. Write for New 8-page Bulletin No. 1086.

For mineral, chemical and other industrial products. Fast, efficient and economical for cleaning, sizing, grading, dewatering. Made in all metals, including stainless steel. Enclosed models for hot materials or dust control. Bonded screens are built for any screening operation, wet or dry.

NEW BONDED® TROUGHING IDLER CONVEYOR BARGAINS

Complete Ready-Fab sections quickly and easily joined together on the job. We take our loss on our stock of short length belting. You can save as much as 50% on the BONDED CONVEYOR SPECIALS listed, with conveyor belting in two pieces. Conveyors are equipped with 5" roll diam. idlers and return rolls, 20" diam. head pulley and 16" diam. tail pulley mounted on 2¼" or 2-7/16" diam. shaft. Belt is new 4-ply, 28-oz. duck, ⅛" top rubber cover x 1/32" bottom cover and is fresh stock made by leading manufacturers.

Remember, You Save Up To 50%

Conveyor Prices Include Belting

Belt Width	Length of Conveyor	List Price	Sale Price
14"	25'	$1397	$ 722
14"	50'	2222	1144
14"	85'	3377	1733
16"	20'	1262	636
16"	45'	2137	1089
16"	60'	2662	1359
16"	90'	3712	1900
18"	25'	1477	794
18"	45'	2217	1166
18"	70'	3142	1648
18"	85'	3697	1933
18"	100'	4252	2220
18"	130'	5362	2797
20"	25'	1517	828
20"	60'	2882	1533
20"	75'	3467	1838
20"	90'	4052	2145
24"	25'	1590	898
24"	45'	2430	1330
24"	70'	3480	1875
24"	100'	4740	2514
24"	120'	5580	2950
24"	150'	6840	3603
30"	50'	2911	1617
30"	70'	3871	2119
30"	90'	4831	2614
36"	25'	1818	1118
36"	45'	2858	1678
36"	60'	3638	2096
36"	100'	5718	3214

For conveyors longer or shorter than those listed above, add or deduct the following per foot prices according to belt width. Prices include belting. Write for Bulletin 1138.

For 14" belt	$16.84 per foot
For 16" belt	18.04 per foot
For 18" belt	19.24 per foot
For 20" belt	20.37 per foot
For 24" belt	21.78 per foot
For 30" belt	24.75 per foot
For 36" belt	27.95 per foot

BONDED TROUGHING IDLER CONVEYORS ARE ALSO AVAILABLE WITH TRUSS TYPE CONSTRUCTION. WRITE FOR DESCRIPTIVE INFORMATION AND PRICES.

NEW CONVEYOR BELTING SAVE UP TO 25%

Heavy duty 4-ply, 28 oz. duck ⅛" top rubber cover by 1/32" bottom cover 12# to 15# average friction pull; 800# to 1000# average cover tensile rubber belting having high tensile strength, tough cotton duck, strong carcass and proper flexibility. For heavy boxes, bags and bulk materials. Troughs easily. Famous brands at deep cut prices. Fresh stock.

Width	Ply	List Price	Sale Price
14"	4	$3.52 foot	$2.83 foot
16"	4	3.96 foot	2.97 foot
18"	4	4.38 foot	3.29 foot
20"	4	4.83 foot	3.80 foot
24"	4	5.68 foot	4.26 foot
30"	4	6.97 foot	5.21 foot
36"	4	8.26 foot	6.18 foot

A high grade of heavy duty 4 and 5-ply, 28 oz. duck, ⅛" top rubber cover x 1/32" bottom rubber cover, 16# to 19# average friction pull, 2500# to 3000# average cover tensile belting. This belt is for more severe service, high tonnages and abrasion resistance. For handling stone, mineral ores, concrete, cement, coal and other similar materials, both wet and dry. Belt has molded rubber edge.

Width	Ply	List Price	Sale Price
16"	4	$4.71 foot	$3.46 foot
18"	4	5.23 foot	3.83 foot
20"	4	5.73 foot	4.37 foot
24"	4	6.74 foot	4.94 foot
30"	4	8.28 foot	6.07 foot
24"	5	7.90 foot	5.78 foot

The following belts are 5-ply, 32 oz. duck:

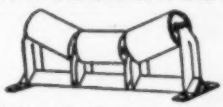
Width	Top Cover	Bottom Cover	List Price	Sale Price
24"	1/8"	1/16"	$ 8.56 foot	$ 6.42 foot
30"	1/8"	1/16"	10.52 foot	7.89 foot
36"	3/16"	1/16"	14.21 foot	10.66 foot

A heavier duty 28 oz. duck belt with ⅛" top rubber cover x 1/32" bottom rubber cover having 3500# to 4000# average cover tensile, 20# to 24# average friction pull. For the higher abrasion resistance applications and handling of materials where more strength is required to give greater belt life.

Width	Ply	List Price	Sale Price
18"	4	$5.67 foot	$4.20 foot
20"	4	6.22 foot	4.61 foot
24"	4	7.32 foot	5.41 foot
24"	5	8.53 foot	6.31 foot

Other widths, plies, duck weights and cover thicknesses available at low prices. Write for Free Sample.

NEW IDLERS AND RETURN ROLLS 25% BELOW LIST PRICE



3-roll, 5" diameter Troughing Idlers for:			
14" belt	$18.50	24" belt	$21.25
16" belt	19.25	30" belt	22.00
18" belt	20.50	36" belt	22.75
20" belt	20.75	48" belt	25.50

1-roll, 5" diameter Return Idlers for:			
14" belt	$7.25	24" belt	$ 8.50
16" belt	7.50	30" belt	9.50
18" belt	8.00	36" belt	10.00
20" belt	8.25	48" belt	11.50

All steel. Interchangeable with other well known makes. Furnished with easily replaceable pre-lubricated sealed ball bearings. Also, can be furnished with greasable type Alemite Fitted bearings at slight additional cost. Maintenance is negligible. Bonded Rubber Disc Impact Idlers also available from $61.00. Write For Bulletin #1138.

NEW BONDED® FEEDERS

For high tonnage and controlled feed of Aggregate, Sand, Gravel, Crushed Stone, Clay products, Metallic Ores, Coal, Cinders and almost any other bulk material to Crushers, Screens, Conveyors, Mills and other process machinery. Feeder may also be driven from tail shaft of Bonded Troughing Idler Conveyors, thus eliminating the necessity of two motors. All models available in abrasion resistant alloy steel plate. Capacities to 250 tons per hour. Write for Bull. #1140 & #1182.
Priced from $255.00

BONDED CONVEYOR PARTS FOR NEW OR OLD CONVEYORS

Holdback $99.00

Return Belt Guide Idler $11.75

Head & Tail $149.00

Carry Belt Guide Idler $14.50

Wing Pulley $71.00

Self-Aligning Idler $60.75

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110 BELLEVUE

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Mfrs. of Scales, Conveyors, Conveyor Parts, Idlers, Vibrating Screens, Crushers and Feeders

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HARDINGE MILLS—4'6"x16", 6'x14", 6'x22", 6'x36", 7'x22", 8'x36", 8'x48", 10'x48".
ROD MILLS—3'x10', 4'x8', 4'x9', 4'x14', 5'x8', 5'x10', 5'x14', 6'6"x14'6".
TUBE MILLS—5'x14', 5'x22', 5'6"x22', 6'6"x21'.
COMPEB MILL 7'x24'.

HAMMERMILLS

JEFFREY—15"x8", 24"x18", 42"x36".
PENNSYLVANIA—SXT-13-48 "THOR", SXC-13-48 REVERSIBLE, CF-5-32 REVERSIBLE IMPACTOR.
CEDAR RAPIDS—5360H DOUBLE IMPELLER IMPACT BREAKER, 3636 DOUBLE IMPELLER IMPACT BREAKER.
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APRON FEEDERS

54"x10'3"—54"x16'—3'x12'.

FILTERS—SEPARATORS—CLASSIFIERS

OLIVER DRUM—8x10', 12'14', 14'x18', 11'6"x18'.
DORR RAKE CLASSIFIERS—5'x25', 8'x38', 12'x31', 14'x30'.
DORR BOWL RAKE—3'x24'x12', 5'x39'x26', 16'x24'x28'.
WOODS SAND CLASSIFIER—72", 96".
CONVEYCO SAND CLASSIFIER—4'x10'.
17 THICKENERS—100', 80', 36', 24', 16' & 12'.
20"x15 EAGLE SINGLE SCREW COARSE MATERIAL WASHER.

ROTARY DRYERS & KILNS

DRYERS—40"x21', 4'x20', 6'x40', 6'x60', 8'x125'.
KILNS—6'x28', 6'x7'x80', 7'x110', 8'x125'.

JAW CRUSHERS

BLAKE TYPE—66"x84", 56"x72", 36"x18", 36"x42", 30"x36", 24"x36", 18"x36", 16"x32".
SINGLE SHAFT—20"x36", 18"x36", 10"x24".
CAM & ROLLER—24"x40", 16"x32", 14"x26", 11"x26", 10"x20", 6"x20".

GYRATORY FINE REDUCTION CRUSHERS

SYMONS—3', 4', and 20".
KENNEDY—19S, 25S, 37S.
SUP. McC.—6", 10", 18".
TRAYLOR—3' TYPE TZ.

GYRATORY PRIMARY CRUSHERS

6", 10", 14", 16", 26" & 36" SUP. McC.—Gates AL. CHAL. 3, 4, 5, 6, 7½, 8, 9, 12K.

15x24 PORTABLE CRUSHER

Model 15 A Diamond Crushing Plant, 15x24 Jaw Crusher, 30'x8' Apron Feeder, Hopper 24" x 26' Conveyor, Gasoline Engine on Pneumatic Tires.

2A CEDAR RAPIDS CRUSHER

24x16 Rolls—3'x8' Screen on Wheels with 4 belt conveyors & Gas Engine.

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1500 TON MZ 32, DP2, 30' & 60'.

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GUY: 3 TON 85 FT. BOOM, 25 TON 60 FT. BOOM, 15 TON 100 FT. BOOM, 29 TON 115 FT. BOOM, 50 TON 100 FT. BOOM.
STIFF LEG: 5 TON 70 FT. BOOM, 15 TON, 100 FT. BOOM, 25 TON 100 FT. BOOM, 75 TON 135 FT. BOOM. 1—5 TON 100 FT. BOOM.

RAILWAY CARS

177—DUMP STD. GA.—20, 16, 12, 6 & 4 YD.
36—FLATS—10 TON, 40 TON, 50 TON CAP.
44—TANK CARS—8,000 & 10,000 GAL. CAP.
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DIESEL LOCOMOTIVES

1—25 TON. 1—80 TON GEN. ELECTRIC.
44 TON G.E., 6 TON WHITCOMB & 10 TON PLYMOUTH. 1—65 TON WHITCOMB.

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FOR SALE
New Esco 4 cu. yd. shovel bucket, heavy duty Mesabi type, for immediate delivery.
EDWARD GEE
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$35,000 of new Carbide Inserted Jackbits at substantial discount.
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CLASSIFIERS—
Dorr 26' bowl with rakes.
Telsmith 36" x 25' sand drag.
PAN CONVEYORS—24" x 18' 30" x 33'—36" x 54'
ELEVATORS—Open inclined 90' with 15 x 14" buckets.
GRIZZLY ROLLS—Frame contains 6 ribbed live rollers 12 dia. x 36"
HAMMERMILL—
Pennsylvania S-6
SEPARATOR—Dings magnetic cross belt with rectifiers and electromagnets.
MOTOR—720 RPM, 75 HP, AC induction. 440/3/60
G. & W. H. CORSON, INC.
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Plymouth 25 ton gas locomotive; 9 others.
Lima 1201 diesel 3½-yd. shovel-dragline.
Crushers; jaw and gyratory, large (5).
Euclid rear dump trucks. Koehring Dumptors.
Johnson, Noble concrete batching plants.
Cranes, shovels, draglines, 1½ to 12-yards.
Walking draglines, Monighans, Page; 3 to 10-yds.
Diesel-electric generators; Hydraulic dredge.
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CATERPILLAR DW-10 SCRAPER
Caterpillar DW-10 Scraper, Hydraulic controls, good running condition. Unit more than worth the price for the parts involved not to mention working life. Would make good rubber tire tractor for pulling Roller.
$3,750.00
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Special: Two backhoe attachments; ½ yd. Unit, and ⅝ yd. Schield Bantam.

Lessman HF-10 loader	Six backhoes; ¾ & ½ yd.	Pioneer 3x10 screen
Terratrac 400	Lorain L-41 magnet crane	Telsmith 30" feeder
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This equipment rebuilt in our modern plant by expert mechanics. Come see it!
10004 Southwest Highway TRACTOR & EQUIPMENT CO. Oak Lawn, Ill.

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RAYMOND ROLLER MILLS
1—#5057 High Side
1—4 Roller Mill
Just Acquired, Good Condition
Available Immediately
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1—5' x 9' Kennedy Ball-Tube Mill; iron liners.
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Position entails process and quality development and control, also investigation of customer problems. Involves some travel to plants and field jobs.

Applicant must have thorough understanding of bituminous mix plant operations, raw materials, and finished product tests and specifications. College engineering education and/or equivalent practical experience. Salary commensurate with education and experience.

Please send resume to Personnel Department

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Allied Chemical & Dye Corp.
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1—Model LP601 Cummins Power Unit—Completely overhauled—New heads $5250.00
1—Model D17000 Caterpillar Power Unit—Good Condition $2750.00

CONTRACTORS EQUIPMENT CO., INC.
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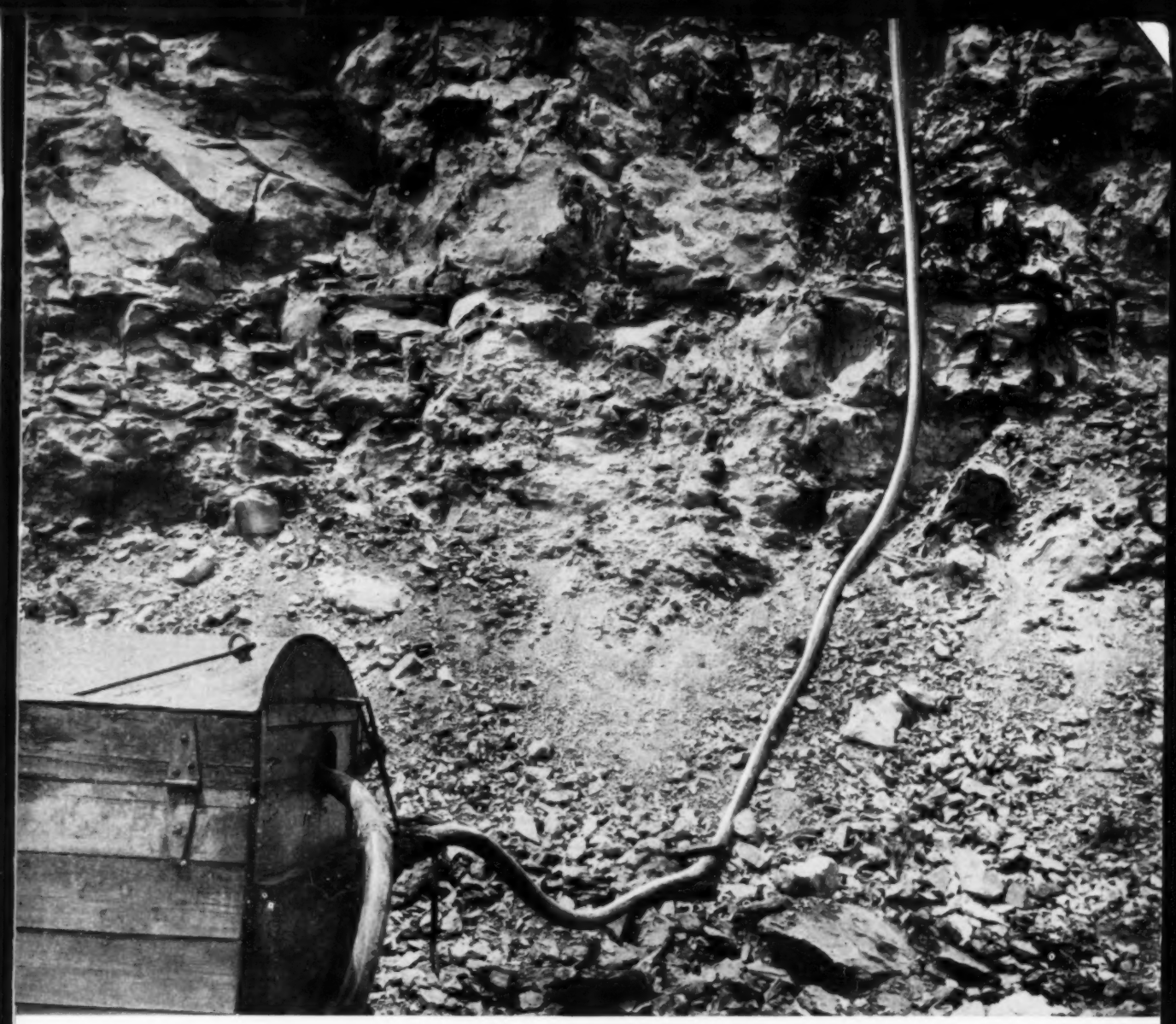

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WIRE ROPE AT WORK

Here is a tireless mechanical monster that strips off incredible tonnages of dirt and rock as it digs for coal. It is the property of A. E. Dick Contracting Co., Hazleton, Pennsylvania. When photographed, the powerful dragline excavator was nearing a rich seam of anthracite that lay beneath the overburden.

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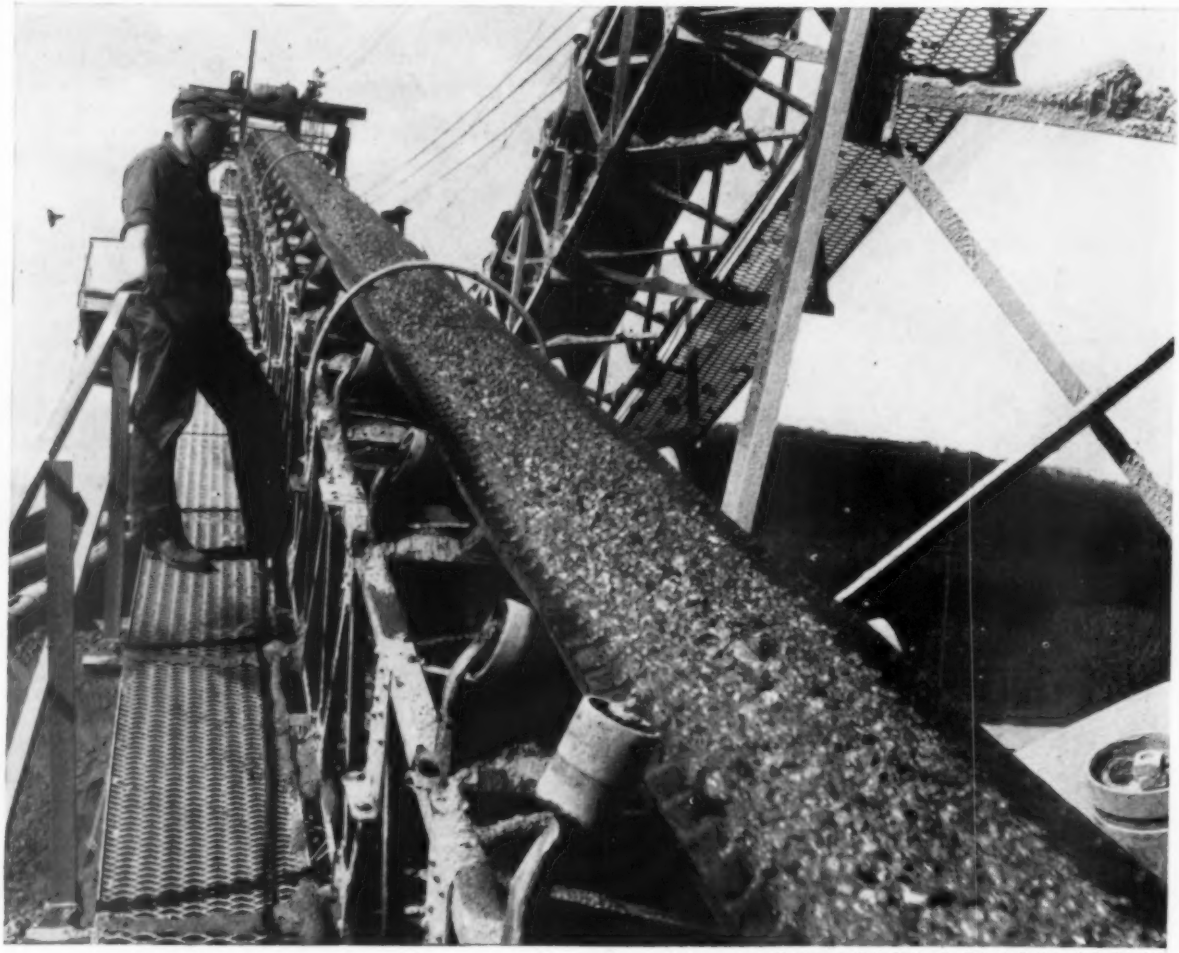

Photo courtesy Basic Construction Materials Division, Chillicothe, Ohio.

Rocks used to slide down faster than they went up

B. F. Goodrich improvements in rubber brought extra savings

Problem: Getting tons of sopping wet rock and gravel up that steep incline was causing plenty of trouble at this plant. When a regular conveyor belt was used, the wet gravel often washed *down* faster than the moving belt could carry it *up*.

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Where to buy: Your B.F.Goodrich distributor has exact specifications for the B.F.Goodrich conveyor belt described here. And, as a factory-trained specialist in rubber products, he *can* answer your questions about *all* the rubber products B.F.Goodrich makes for industry. *B.F.Goodrich Industrial Products Co., Dept. M-995, Akron 18, O.*

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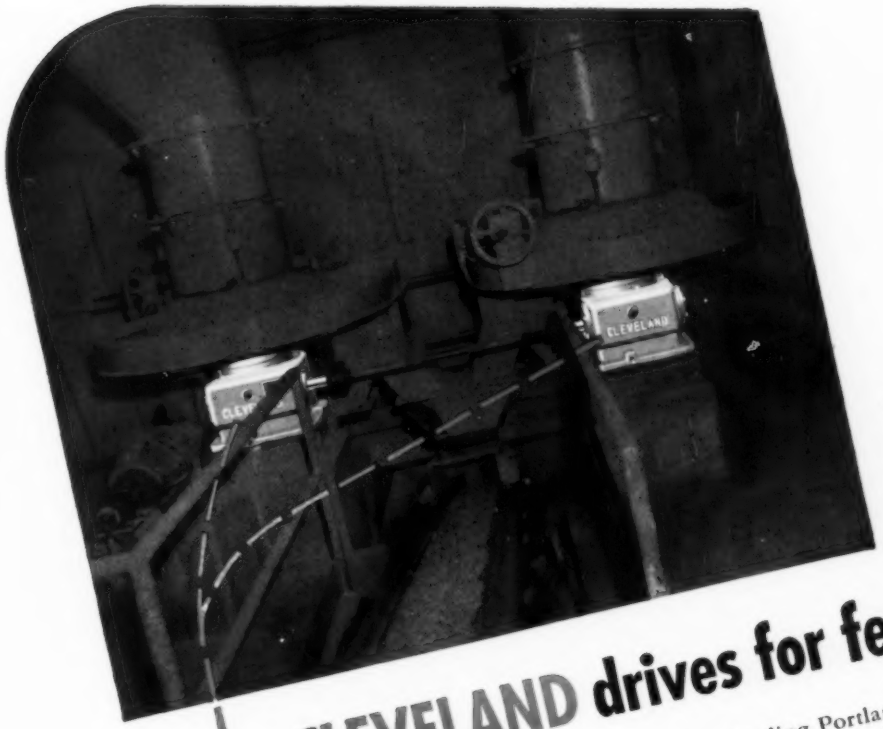

Two Cleveland vertical units, Type NU, driven by a single motor, make possible an accurately blended mixture of "high shell" and "low shell".

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